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ABSTRACT

This report contains three papers discussing skill hierarchy approaches to reading instruction. Jana Mason presents an historical and theoretical review of the notion of a reading skills hierarchy, relates it to three major types of reading programs currently in use, and argues that it is instructionally advantageous to construct a decoding hierarchy but not a comprehension skills hierarchy. Jean Osborn summarizes the programming, instructional, and teaching strategies used for the presentation of decoding skills in four published reading series, and points out that, although each program does teach a set of decoding skills, programs differ in the skills taught and the order and rate at which they are introduced. Barak Rosenshine explores what is known about skill hierarchies in reading comprehension, identifying major reading comprehension skills but finding no evidence of a skills hierarchy in elementary reading series. (AA)

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CENTER FOR THE STUDY OF READING

Technical Report No. 42

A CONSIDERATION OF SKILL HIERARCHY APPROACHES TO THE TEACHING OF READING

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A Consideration of Skill Hierarchy Approaches to the Teaching of Reading

Through the years, the term reading has had a number of different meanings ascribed to it by various theorists. For Thorndike (1917), reading is a process of elaborating meaning in relation to print; for Vernon (1931), it is the visual perception of word forms and their meanings; and according to Carroll (1964), reading involves the psychological processes of decoding the sound from the graphemes and comprehending the decoded message. Although each of these definitions contains the same essential ingredients, print and meaning, the stress is different and connotes differences in interpretation. As these views on reading have varied, it is not surprising that the preferred form of instruction would show corresponding variation. Here we will attempt to deal with a class of instructional curricula--skill hierarchy approaches--and present a description of a number of programs, along with some general conclusions. The main questions which emerge concern the extent to which distinctive, separable skills have been identified, the extent to which these skills can be placed into some hierarchical model, and whether alternative reading programs have established similar orderings of skills.

In the initial section, we place the skills hierarchy approach into historical perspective, reviewing the trends in early reading instruction and considering some of the factors which have led to the development of the programs being reviewed. As there should be some relation between these programs and knowledge gleaned from the fields of linguistics and cognitive developmental psychology, among others, we present a brief review of some recent findings from these areas, along with the implications of those findings from these areas, and the implications of those findings for general skill hierarchy approaches.

To facilitate the description of specific programs, we have divided their content into aspects dealing with decoding and with comprehension. That we realize that the separation is not a complete one is reflected in our commitment to an interactive conceptualization of the overall process of extracting meaning from text. Nonetheless, the sets of skills do allow a fairly natural breakdown, and comparisons across programs can more easily be made by considering the two sets successively rather than simultaneously.

An Historical Perspective

Initial instruction in the alphabet and in oral reading was reportedly the prevailing instructional technique until the early part of the twentieth century when Dearborn demonstrated that children could learn to read without explicit instruction in the alphabet (Diederich, 1973). This whole word or "look - say" approach was then subscribed to, not because it was a better method, but because it seemed to be as successful as a letter approach yet considerably easier to teach. An important assumption in a whole word methodology was that children could learn to recognize print if the words were meaningful. For this reason, children's readers were constructed to favor high frequency printed words. Instruction consisted primarily of drill and repetition. Contextual cues were emphasized as one means of recognizing words, and in primers, pictures elaborated on the sparse and repetitive text. Children who were slow to learn by this approach were usually drilled on a set of 220 basic words (the Dolch, 1948, list of the highest frequency words, the majority of which are function words). Knowledge of these 220 words results in a 50+% recognition of a running count of words appearing in elementary texts. The fact that more than half of the words in this list contain irregular or minor letter-sound patterns was ignored. The ability to "read" a passage was emphasized in this era rather than the ability to generalize letter-sound patterns to new words.

Vernon's (1931) emphasis on the role of visual perception and eye movement patterns, along with the importance of efficient silent reading appears to have signaled a resurgence of phonics instruction. Because phonics instruction was an extension of existing whole word oriented texts, this approach is labeled "sight-phonics". According to Aukerman (1971, Chapter 2), supplemental instructional guides in phonics were developed and published during the 1940's and the 1950's. These were largely a set of rules for uncovering letter-to-sound relationships (e.g., "ER, UR, IR are sisters and OY, OI are brothers"; "When two vowels go a-walking, the first one does the talking"; "Each syllable has one vowel sound so find the vowel to sound out each syllable".) In general, an analytic procedure was relied on for reading new words (e.g., "Find the little words in the big word"; "Hear the sound as you say my name [initial sound of a pictured object] and find some words that begin the same".)

Most of these guides were constructed by classroom teachers as readiness or supplemental materials for the basal reader programs. Generally, consonant names and sounds were taught first, followed by short vowels, long vowels, and then the consonant digraphs. However, these rules and procedures varied considerably because each writer developed his own analysis of structure, (e.g., in Functional Phonetics, the vowel is pronounced with the initial consonant, as Spo - t (Aukerman, 1971, page 57) while Ginn 360 treats the final ot cluster as a word family to be separated from the initial letters).

Contemporary sight-phonics programs constructed under the sight word rationale of word-frequency control (e.g., Ginn, Scott Foresman, Houghton Mifflin) have adopted versions of these phonics approaches, and beginning reading lessons have retained the use of a large sight-acquired vocabulary, drill and practice to learn words, and advice to rely on context or picture clues to identify words. Phonics instruction is relatively independent of the basal text. As an example, in the phonics lessons in Ginn 360, Level 2, children learn the sounds of consonants in the initial word position, and practice those sounds in picture-matching workbook exercises. But nearly all 29 words that are taught in Level 2 are introduced by a sight-memory approach and are not related to the phonics lessons. Thus, sight-phonics programs provide phonics as a separate curricular strand of reading.

Letter-pattern controlled programs, by contrast, embedded phonics into text materials themselves. The notion that decoding and comprehension reflect different processes and language structures was hearlded by Bloomfield (1933; 1942) and later by Fries (1963). Both regarded an organized restriction of the text by letter-sound pattern to be a necessary component of reading instruction. This view which contrasts sharply with earlier positions, was espoused because "one must have an ingrained habit of producing the sounds of one's language when one sees the written marks which conveniently represent the phonemes" (Bloomfield, 1942, page 128). Since common English words are notorious for their letter-sound irregularity, it was presumed that an effective way to establish the habit was to allow beginning readers to read only texts containing letter-sound patterns which they had previously learned. In that way they could identify words through generalization of letter structure. This type of instruction is called "linguistic" by Aukerman; here it will be termed "letter-pattern control".

Reading programs restricted by letter-patterns followed the Bloomfield-Barnhard Let's Read series (e.g., series published by Lippincott, SRA, Merrill, Distar, Heath and Co., Holt, Sullivan and the government sponsored programs developed at University of Pittsburgh and at Southwest Regional Laboratory Center for Learning). These programs have in common a definition of "pattern" in terms of frequency of occurrence where the more commonly appearing letter-sound correspondences are called "regular" or "major" patterns. These are presented in texts and taught before the less commonly occurring patterns to foster a success-bound strategy of applying letter-sound correspondences to the decoding of new words. Often, common irregular words are inserted (and usually taught by sight) only when needed to make stories sensible. In addition, some words with regular letter-sounds which have not yet been taught will be presented as sight words (e.g., in Merrill, on and not are sight words because children had not learned the short o sound when the words were needed for stories). Typically, these programs begin with consonant and short vowel sounds from which familiar and unfamiliar, three-letter words are constructed and used to build simple sentences and stories (e.g., Lippincott: "Ann ran. A man ran. A ram ran." Merrill: "Pat the cat. Pat the fat cat. The fat cat is Nat.") Vowel and consonant digraphs such as ai and sh, VCC patterns like -all or -ight, and other cluster patterns (e.g., -ate, -tion, ce-, and wa-) are usually delayed until the child has mastered the CVC-short vowel principle. In some programs blending of letters to construct (synthesize) words is explicitly taught and favored over an analytic procedure of separating words into letter-cluster units.

This third and most recently developed approach to reading instruction reflects a current inclination to pull apart the reading act into definable and observable skills. In practice it diverges from the whole word and sight-phonics programs essentially because of the shift to letter-controlled materials. Letter control makes it possible to completely integrate phonics activities with reading practice, to emphasize a sounding-out strategy (blending), and to entertain questions about an effective ordering of letter-sound patterns and the organization of decoding skills-skills hierarchy questions. It is also possible to worry about creating a false sense of letter-sound invariance or a loss of text meaning through an emphasis on decoding.

Chall (1967) arrived at a similar categorization of reading programs using the terms "look - say," "intrinsic phonics," and "systematic phonics" for the programs that are termed here "whole word," "sight-phonics," and "letter-pattern controlled." It is worth mentioning that a summary of four of Chall's tables based on a total of 34 studies, indicates an overwhelming superiority of letter-pattern controlled programs.

Historically, then, three clearly discernable instructional programs have dominated the reading field. The first is a whole word approach which is based on the tenet that repeated use of common words is the most critical element for initial reading instruction. The second approach, sight-phonics, has a strong phonics program embedded into whole word type reading material and teaching technique. Letter-pattern control, which is the third approach, relies on an organization of all reading material according to the commonness of letter-to-sound correspondences and letter-cluster patterns in order to encourage a recognition of words on the basis of generalizable letter structures.

One could argue that there are other types of approaches which have not been separately classified. Many of these are actually variations of a sight-phonics approach (e.g., Phonetic Keys to Reading). Language experience programs are initially different since children actually construct their own stories. However, in practice, this procedure appears to be used as an introduction to reading and supplemented by a sight-phonics approach. Programmed reading programs are similar to letter-pattern controlled approaches. Modified alphabet programs (e.g., I.T.A.) rely on a sight-phonics methodology.

Comparison of Programs in Terms of a Skill Hierarchy

Any skills hierarchy approach rests on the assumption that essential skills exist and can be taught. This in turn is a topic for study only if the skills constitute observable and measurable behaviors which can be viewed within the context of some terminal objective, and which are a necessary component of reading. Some approaches are more compatible with a skills hierarchy model than others. In fact, it can be argued that programs which use letter-sound controlled texts may be the only ones that can readily be discussed in terms of a skills hierarchy. A whole word instructional approach is not easily described in terms of skills since the reading act is defined quite globally as an acquisition of the meaning in print. Lessons consist of occasions for practicing the recognition of whole words and reading them in context. The whole word approach is not analytic, then, and because so few skills are identified, this approach probably falls outside the domain of a skills hierarchy.

Similarly, sight-phonics reading programs also fail to conform easily to a notion of a skills hierarchy. The very reliance on the control of text by word frequency rather than by letter-pattern is the principal problem. Is it possible to teach systematically skills of decoding when: 1) the majority of words children learn to read in the first two years of instruction are not decodable but are taught by sight; and 2) the sight word vocabulary often contradicts the patterns being taught in the phonics lessons (e.g., the child learns a short a for consonant-vowel-consonant (CVC) words but reads was in a story)? Memorizing words for later recognition in print is easier than learning letter-sounds and combining them into words, but treating words to be recognized as logographs results in children learning by sight words that with letter-sound training could be decoded. This means that skills are loosely ordered (e.g., a child might memorize Sam, mat, sat but later learn t,m,ǎ,s; syllabication instruction follows letter-cluster lessons even though children have already learned to recognize many two-three syllable words). Also teaching sight words like said, saw, or was that violate letter-sound pattern regularity but which characterizes a substantial number of words found in a sight-phonics program, may even interfere with letter-sound rule generalization (Surber and Mason, in Press).

These arguments suggest that skills hierarchies for decoding are not a typical method of organization. Whole-word and sight-phonics programs, which make up the greater portion of existing approaches to reading, should not be classified in terms of skills hierarchies if precise definitions of skills are intended. The remarks that follow then, are aimed at contrasting a skills hierarchy approach, as exemplified by letter pattern control, with other programs.

Linguistic Criticisms of a Skills Hierarchy for Reading

Linguists are concerned with formalizing what the ideal native speaker knows about his language. This set of rules, which will generate all possible sentences of a language, mirrors the native speaker's competence. How the native speaker actually goes about producing a sentence is a matter of performance, and while the set of generative rules will presumably be incorporated into a theory of performance, there will also be many psychological variables involved, such as memory limits, attention, etc. The relationship between the generative rules (competence) and performance has never been explicitly stated and recent psycholinguistic research shows that it is far from simple, although it is still assumed to exist.

Because of this emphasis on competence, the generative-transformational linguist would not see any obvious application of his research to a behavior such as reading. However, because linguistics is concerned with explicitly analyzing language, the findings produced do yield insights into the system that the beginning reader is trying to master.

A linguist is likely to consider two aspects of language: 1) the structural characteristics of the language with respect to what the child is taught and 2) the relationships between theories about language development and reading. With respect to the first point, it is apparent that orthographic, phonological, morphological, syntatic, and semantic structures need to be considered. Considering the second point, the acquisition of language not only details what the child is likely to know and not know about language during initial reading instruction but also offers clues about the kinds of implicit rules children may be using in learning to generalize (e.g., from taught letter-sound rules for bound morphemes to the generalization of those rules to multisyllable words, or as in disambiguating words and sentences and seeking alternative meanings from metaphors).

Linguists (Bloomfield, Fries and Venezky, among others) have played a substantial role in the construction of letter-pattern controlled reading programs, viewing this approach as the one which most effectively indicates to the child the inherent regularity of the grapho-phonological system. In this way, the most regular structures are made available first, thereby taking advantage of the generalizability of patterns to new words and eliminating reliance on rote memorization of every word. Thus, letter-pattern controlled texts are likely to provide a basis for more effective acquisition of decoding skills than can a whole word program. A letter-pattern controlled reading program is also more efficient than a sight-phonics program because, unlike letter-controlled programs, sight-phonics programs do not rely on an ability to decode new words by letter-sound principles until much later in an instructional sequence when both the generalizable and unique patterns have been introduced. Neither whole word nor sight-phonics programs make the generalizable pattern obvious to the beginning reader. A typical sentence from a whole word approach, "Jill said, "Stop here." contains one irregular vowel patterned word (said) and one r-influenced vowel word (here). By contrast, a letter-pattern controlled sentence, "Dan and Don run" displays only generalizable short vowel pattern of CVC words. Words such as look, said, laugh, was, there, and one are delayed or used sparingly in letter-pattern controlled programs until the reader has recognized and extended to new words the more regular patterns.

Developmental studies of children's knowledge of letter and word boundaries demonstrate that before children receive reading instruction, they have little conscious notion about word-ness and cannot distinguish phonemes; i.e., they do not have certain metareading skills. Huttenlocher (1964) showed that preschool children could not separate and reverse words which occur together frequently in sentences, e.g., Man - runs. Liberman (1973) found that only 17% of five-year olds but 70% of six-year olds could segment spoken words into phonemes. Calfee, Chapman, and Venezky (1972) obtained chance level behavior in identifying initial consonant sounds of words from kindergarten children. Bruce (1964) found that seven-year old children, but not six-year olds, could delete an inner consonant sound from words, e.g., stand--sand. These studies suggest that skills which experienced readers take for granted should not be assumed to be understood by beginning readers.

Another set of studies suggests that phonemic segmentation and/or letter-sound regularity need to be made more accessible to beginning readers because these are closely related to later reading success. Calfee, Lindamood and Lindamood (1973) found that a significant correlation between phonemic segmentation ability and reading ability was retained through grade twelve, with children rated in the lower half in terms of reading obtaining appreciable lower scores from grade two on. Venezky and Johnson (1973) studied the ability of first, second, and third graders to read nonsense words beginning with ce, ci, cy as soft c and ca, cu, or co as hard c, also to apply a short vowel sound to CVC non-words. They found that these abilities were significantly related to age and reading skill. Mason (1976), analyzing first through fourth graders' pronunciation errors, found that the low ability readers, regardless of grade, gave a high proportion of short vowel substitutions; e.g., sort was read sot, teem was tem. The high ability readers missed very few words containing one vowel, and with CVVC words, tended to "regularize" the vowel pair, e.g., steak became steke.

Studies of generalization of letter patterns have placed more emphasis on learning the regularities that exist between the vowel sounds and their written representation than on learning consonants. Generally, consonant graphemes have a closer fit to the consonantal sounds and, most likely for this reason, generate fewer pronunciation errors. Shankweiller and Liberman (1972) found that good and poor readers alike made fewer consonant errors than vowel errors. Lucas (1973), in looking for errors that would predict second graders' reading, found that a vowel error accounted for 74% of the variance on a standardized reading test. It is clear that vowel generalization has a major impact on beginning reading.

An essential component, then, of letter-patterned approaches is the uncovering of vowel regularity. The deliberate restraint in initial instruction to CVC words containing a short vowel has both structural validity (Venezky, 1970) and experimental validity. By contrast, frequency-controlled texts, by emphasizing common words (which contain irregular vowels) obscure regularity and ignore the opportunity for implicit generalization of regular vowel-to-sound correspondences. Thus, a skills hierarchy which makes explicit to the child the regularity of letter-sound correspondence offers a sound procedure for recognizing unknown words.

A second, common component of letter-controlled programs is explicit instruction in blending--a strategy for learning to pronounce new words by "putting together" each letter sound and then "reading it fast." There is some evidence that this procedure is extremely important. It appears to enable children to transfer learned patterns to new words (Silberman, 1964; Jeffrey & Samuels, 1967; Marsh & Sherman, 1970). It is significantly correlated (about .60) with oral and silent reading ability. In the Calfee et al (1973) study, recombining phonemes into sequences differentiated upper and lower ability readers, where ordering phonemes into sequences was equally easy for all fifth through twelfth-grade children. Blending was a component in all five of the more successful programs in a comparison of ten first-grade reading programs (Bliesmer & Yarborough, 1965). Whether there is a causal relation between blending (or recombining phonemes) and learning to read has not been sufficiently documented. On the basis of linguistic theory, blending should be a very difficult task because first, certain consonants cannot be pronounced in isolation, e.g., the stops (b,d,g,p,t,k). When a child is required to recite these letter sounds, he will insert a schwa and will often produce a deviant sequence which cannot be identified with the target word: "bad" /bə/+/ae/+/də/=/ʔ/. Furthermore, the phonetic environment will change the actual sound (pronunciation) of a given phoneme: the /k/ that occurs before a front vowel, "kiss", is different from the /k/ preceding a back vowel, "coop." This may be confusing to the beginning reader who is instructed in the blending technique.

If some sort of phonemic recoding experience is an important component in learning to read, as the above studies suggest, much more research should be conducted to establish what exactly is involved in this behavior and what sort of variables influence it. For example, methods for segmenting words into phonemes, identifying phonemic clusters (e.g., -*ight* or -*ame*), and ignoring minor phonemic differences in the interest of classifying larger structures (e.g., accepting a short *o* sound for the words *song* and *dog*) need to be studied in the classroom before confidence about their pedogogical value is realized.

Some linguists consider the process of learning to read as "the process of transfer from the auditory signs for language signals which the child has already learned to the new visual signs for the same signals" (Fries, 1963, p. 134). Mattingly (1972), however, suggests that listening and reading are not directly analogous since a listener has to "demodulate" (separate out essential phonemic cues from irrelevant detail) while a reader has discrete symbols to identify. Chomsky and Halle (1968) argue that, in listening, the phonemic properties of an utterance are uncovered through a sequential application of morphophonemic rules. In reading, the failure of English orthography to mirror exactly the sound system places it at a more abstract level. Klima (1972) discusses in considerable detail the rules governing the relationship between the orthography and the morphological system. Emphasizing properties of orthographic economy, Klima demonstrates how orthographic patterns that appear ambiguous or irregular retain regularities at another level of analysis. For instance, the fact that the -ng sequence in singer and finger are pronounced differently, as is the -s in reseat and result, superficially seems to be an unprincipled variation. However, at a slightly deeper (more abstract) level of analysis, both singer and reseat contain bound morphemes (-er and re-) which is reflected by the pronunciation but not by the spelling. The presence of apparent phonemic arbitrariness may be a function of the surrounding sounds, e.g., the pronunciation of t varies in the words Kantian and Egyptian. Likewise, changes in phonemic patterns of bound morphemes can be ascribed to the phonetic environment of the last consonant in the stem word, as in the presence or absence of the consonantal feature of voicing:

tap+s=/taeps/ but pad+s=/ paedz/

rotate + - ion = / rōtāsyon/ but delude + - ion = /dēlūzyon/.

These analyses suggest to this author four important points that are related to a skills hierarchy for reading. The first is that it is the orthographic and phonological systems together that enable a child to master new words. It is not sufficient to teach children to discriminate letters visually, that is, to teach them to recognize, name, and print letters. There is now as strong an angument for teaching beginning readers to differentiate and articulate phonemes and reorganize them in word contexts as there has been in the past to teach letter names and sight recognition of words.

The second point concerns the apparent disassociation between the English morphological structure and the methods used to teach children about it. Instead of being introduced to the morphophonemic properties of orthographic or phonological changes, children are taught an increasingly longer list of syllabication rules in each succeeding grade as exceptions to a previously taught rule set appear in spelling or reading books. This practice suggests that research should be conducted regarding an application and ordering of morphological rules to the articulation and spelling of multisyllable words.

The third point concerns the possible application of language acquisition to reading instruction. Language competency is not arrived at principally through imitation, repetition, or deliberate instruction

(Wardhaugh, 1976). It is apparent that children, when they first begin to speak, construct their own system of language structures (Bloom, 1970; Brown, 1973; Nelson, 1973), which corresponds to the mature language system of adult native speakers in ways that can be explicitly characterized. Order of acquisition of word meanings and grammatical structures is better explained in terms of semantic content than frequency of usage or instruction (Clark, 1973; Slobin, 1966). Although reading and language acquisition are quite different tasks, some of the factors shown to be important in speech development might be occurring in reading. The predominant use of deliberate repetition, external control of printed words, and correction of phonemic and syntactic error deserve to be reconsidered. What do children learn without explicit reading instruction? What roles does a skills hierarchy approach play in the child's acquisition of written language principles? These areas have not been sufficiently explored to date.

The final point relates to initial instruction and entering differences among the children. A study by Read (1971) suggests that bright four-year-olds have an appreciable intuitive sense of letter-sound correspondences. Similarly, an unpublished study by Mason shows that four-year-old children of middle-class parents can recite the alphabet, name, and print letters, and read their own name, traffic signs, food labels, and store signs. They pronounce very few words out of context but can be taught to do so, particularly if the printed words are taught by sight in conjunction with meaning-related pictures. However, Rozin, Poritsky, & Sotsky (1971) found that older inner city children seemed able to learn only by a sight method. The point to be made here is that the environment has an appreciable influence on the child's knowledge of letters and words. What is an appropriate starting point of a skills hierarchy is a question worth asking. Further, do the substantial differences in preparation suggest radically different initial school instructions for different children? That is, beyond a documentation of a skills hierarchy lies the problem of defining the initial skills that may be prerequisite to reading.

Cognitive Learning Theory and Skills Hierarchies

Although there have been two perspective shifts in reading instruction since Thorndike, major aspects of his learning model have never been abandoned, in particular, the notion of learning by association. For example, it is still true that children practice oral responses to lists of printed words. They memorize rules for pronouncing words and their instruction is organized into repetitive cycles. Yet, cognitive psychologists no longer rely on association theories and stimulus-response models. This point is suggested by Anderson and Bower (1973) and pointedly discussed by Jenkins (1974). To date, the change in orientation has not had an impact in any substantial way on reading instruction. That it will can be assumed. That it has not means that this section of the paper will explore potential applications of a cognitive learning model on reading instruction. This model replaces the notion of associative linking with a view that the learner's framework better determines what is remembered.

Associationists rely on the notions of links between what is known and what is to be learned. Mental structures are thought of in terms of chains of learned, related ideas. These chains are weakened by disuse and strengthened by repetition, response-shaping, cue-fading, and reinforcement of desired responses. Contextualists (the term coined by Jenkins to describe the current view to be described here) have drawn from philosophers including W. James, J. Dewey, L. Wittgenstein, and J. Austin. What memory is depends on the task, one's past knowledge and experience, and the schematic representation of that knowledge. In some contexts and with some tasks, then, associationist procedures will still be effective but these can no longer be considered sufficient in any instructional paradigm. More elusive characteristics must be considered: what the learner understands about the nature of the task as well as his organization of knowledge pertaining to the task, the organization of the material to be learned, and the kinds of strategies the learner brings to bear on carrying out the task. It is apparent that memory cannot be thought of as a set of boxes in a flow diagram and that the inner working of the mind cannot be left in the black box of unobservable, and therefore uninteresting, behaviors. The implications of this analysis for the study of developmental problems has been described by Brown (1975). Some instructional implications are that (1) text comprehension which must be influenced by the reader's framework cannot be defined in terms of ordered skills; (2) programs which emphasize background information and focus the reader on key elements of a story better match a contextualist view; and (3) it is not word familiarity as such which improves comprehensibility but familiarity of the concepts as a whole which are portrayed in text materials. Thus, most reading programs do not contain a hierarchy of comprehension skills; their appropriateness may be better assessed by analyzing the relatedness of concepts and degree of interest to the reader.

Experimental evidence of contextualism. A review by Chi (1976) provides an enlightening introduction to the change in outlook being explored by psychologists. She demonstrates that apparent capacity differences of adults and children in short term memory can be attributed to differences in processing. In particular, adults use memory-assisting (mnemonic) strategies of rehearsal, naming, grouping, and recoding which are less frequently engaged in by children. In addition, the complexity of a knowledge base (or contents of long term memory) affects the ability to chunk (to group or categorize) information, the size of a chunk, and the accessibility of a chunk (such as the length of time taken to recognize or retrieve a chunk). The review supports the notion that what subjects know, how knowledge is organized, and what processing strategies they use account for data which had been interpreted previously by mechanistic capacity limitations.

Studies by Craik (Craik & Lockhart, 1972; Moscovitch & Craik, 1976) and Jenkins (Hyde & Jenkins, 1969; Johnston & Jenkins, 1971), demonstrate the power of the task on memory. Espousing a notion of depth of processing, memory can be influenced by the level at which a task engages a subject. A semantic encoding task, which can be manipulated by asking subjects to place stimuli into meaning-related categories, encourages deep level processing and generates better memory for the material than does a shallow, phonological encoding task (e.g., rhyming) or a visual encoding task (e.g., noting the presence or absence of letter information). Actually, with young children, tasks which force semantic processing result in more recall than do specific instructions to memorize (Murphy and Brown, 1975).

How the material is structured plays a role also in memory. This was illustrated by Bransford and Franks (1971). Subjects were asked to listen to and hold in memory a set of 24 sentences. The sentences, in a mixed order, described elements of four unrelated scenes. Following this, subjects judged whether they had heard a sentence before and how sure they were. Results were similar to clustering experiments in free recall studies that used randomly-ordered but conceptually related words. Subjects grouped together sentences which referenced an event, here by judging as "old" sentences that were never seen before but which expressed two or more elements of a scene. They accurately judged as "new," sentences that confused elements of the scenes. These phenomena are very general and have been obtained in a variety of situations with children as young as preschool age (Brown, 1976; Paris & Carter, 1973).

Investigations related to comprehension skills. Text level analyses indicate effects on text recall or on text verification of conceptual organization of text (Bower, Clark, Lesgold, & Winzenz, 1969), categorical integration (Bransford & Franks, 1971), spatial integration (Bransford, Barclay, & Franks, 1972), text structure (Frederiksen, 1973), verb-based conceptual inference (Schank, 1972), the number of propositions in sentences (Kintsch, 1974), repetition of propositional arguments (Manelis & Yekovich, 1976), instantiated sentence cues (Anderson & Ortony, 1975; Anderson, Pichert, Goetz, Schallert, Stevens, & Trollip, 1976), identification of narrative elements of plot organization (Thorndyke, 1975), and generation of plausible inferences (Thorndyke, 1976). All but the last four mentioned studies dealt with text organization. The Anderson et al. and Thorndyke studies measured the subjects' inferential activity.

The studies of inferential activity need to be described in somewhat greater detail to be understood. Anderson and Ortony (1975) showed that word cues which are good instantiations of sentences facilitate sentence retrieval (e.g., odds can instantiate Coins can be flipped but not Pancakes can be flipped or Coins are difficult to forge). Anderson et al. (1976) determined that particular terms are better retrieval cues for the sentences than are the general noun cues which appear in the sentence so long as the sentence implies the particular term (e.g., shark is a better cue than fish in The fish attacked the swimmer but not The fish avoided the swimmer). Thorndyke (1976) showed that verification of sentences in a text can be manipulated by the presence or absence of sentences which disambiguate earlier constructed plausible inferences. For example, sentence (1) suggests inferences (2), (3), and (4):

(1) The hamburger chain owner was afraid his love for french fries would ruin his marriage.

(2) The hamburger chain owner got his french fries for free.

(3) The hamburger chain owner's wife didn't like french fries.

(4) The hamburger chain owner was very fat.

(5) The hamburger chain owner decided to join Weight-Watchers in order to save his marriage.

If sentence (5) occurs later in the text, the reader would make an inference chain back to (1), reinforce the probably validity of (4), reduce (3) and leave (2) unchanged in plausibility. Thorndyke showed this to occur by including sentence (5) types in texts for some subjects but not for others.

These studies have shown that "what is stored in memory, then, is a structure encoding the situation described by a series of related propositions and their requisite inferences. Within such an organizing frame the inferences become indistinguishable from explicitly stated information" (Thorndyke, 1976, p. 444). They clearly demonstrate the importance of the reader's framework in analyzing or predicting his/her comprehension levels.

Developmental aspects and skills hierarchy approaches. As the foregoing discussion illustrates, the view of memory currently popular differs considerably from that of the associationists. Concurrent with this change in theoretical perspective has been an increase in the amount of research addressed to higher-level skills and the comprehension process itself. Similar trends are apparent in the developmental literature, and an inspection of these trends leads to some clear parallels with the discussion of comprehension skills hierarchy approaches.

The most interesting point is a simple one. While the work of cognitive developmentalists has proceeded independently of refinements in the area of curriculum design, both groups have tended to emphasize the same set of skills. That is, whether the aim has been to build a model of the comprehension process or to develop a curriculum, the same activities have been highlighted. To illustrate, a list of eight comprehension skills which are common to a number of curricula is presented in another section.

Of these, six are most strongly represented in the actual instructional materials: responding to questions about detail; identifying the main idea; regenerating sequences of items or ideas; drawing conclusions; responding to words in context; and forming inferences. Developmental psychologists interested in comprehension have recently begun investigating children's ability to abstract the main idea of a story (e.g., Brown & Smiley, 1977) and to regenerate it in proper sequence (Brown, 1976a; Stein & Glenn, 1975). In addition, there has been considerable interest in the ability of children to "go beyond the information given" and in the role this ability plays in comprehension and subsequent recall of discourse materials. Several types of inferences have been investigated, ranging from drawing necessary conclusions following logically from premise information (Brown, 1976b; Paris & Carter, 1973) to making probabilistic inferences about the consequences of certain action sequences (Paris, Lindauer & Cox, in press). Finally, there has been work addressed to the role of context in affecting the interpretations of words and/or sentences.

In our view, these correspondences between theorists and practitioners suggest that the skills are in fact reasonable ones on which to concentrate. However, these studies have less to say about skill hierarchies. On first glance, the developmental studies seem to provide at least a number of suggestions. Some of the skills develop gradually, such as abstracting the main idea; whereas others, like the tendency to integrate information from separate statements into a single holistic representation, appear to be present very early. If various skills appeared spontaneously at different points in development, some implications regarding the distinctiveness of the different skills might follow, and some inferences about hierarchies might be drawn. However, it is not obvious that a clear developmental progression could ever be documented. The problem is that the likelihood that children will demonstrate "mastery" of any particular skill depends upon the general complexity of the task environment. For example, children unable to identify the main ideas of a story using the Brown and Smiley procedure of crossing out unessential sentences, thus leaving the main ideas as the remaining sentences, can perform adequately with pictorial representations of simple stories and scenes.

Since such Age x Task interaction effects can be obtained with any skill (witness the large number of studies lowering the minimal age at which certain Piagetian tasks can be solved), it becomes difficult to describe a clear developmental progression. If, with a given set of materials and tasks, skill A is present but B is absent for some age group, it may be that the task demands surrounding assessment of A are "simpler" than those of B. Unless the circumstances can be equated for difficulty, no clear conclusion can be drawn. This in turn would require a "difficulty" metric applicable across a wide variety of circumstances.

In one way, this feature may be represented in the skills hierarchies curricula. One property of a hierarchy should be the termination of instruction (or practice) on a skill after it is presumed to be mastered. In fact, the instructional materials continue representing all skills for the duration of the program. What happens is that the skills (e.g., identifying the main idea), are practiced in successively more difficult situations. Essentially, the skill is not considered to be present or absent, but rather the sophistication and flexibility with which the skill is applied are presumed to be developing over a long period of time.

Reiterating, there appears to be some genuine agreement among cognitive developmentalists and curriculum designers concerning skills involved in comprehension. If we were to outline any suggestions cognitive researchers would make to curriculum designers, it would be in the areas of comprehension monitoring and reacting to comprehension failures. There are data available indicating that children do not necessarily monitor their ability to understand discourse (see Brown, 1975, for a review; Markman, 1977); they assume they understand when in fact they do not (or cannot). Such monitoring appears to be an important comprehension-related skill and one which could be emphasized in instruction. A related set of skills would then be those engaged when a comprehension failure has been detected.

Word Perception Studies and Skills Hierarchies

Word perception studies have represented a classic way of simplifying one aspect of the reading act in order to investigate the process. Cattell (1885), by showing that words could be recognized as rapidly as single letters, concluded that meaningfulness plays a crucial role in reading. Since then, this effect and the advantage of high frequency words over low frequency words (or words over nonwords) has been attributed to orthographic familiarity (Gibson, Shurcliff & Yonas, 1970; Baron & Thurston, 1973), phonemic recoding (Rubenstein, Lewis & Rubenstein, 1971), a lexical search (Forster & Chambers, 1973) or phonemic recoding and a lexical search (Meyer, Schvaneveldt & Ruddy, 1974). One study compared word frequency effects between adults and fifth graders (Mason, 1976). The facilitative effects of high frequency words was attributed to their greater accessibility in a lexical search operation. Similar processing by both groups was found, though there was more apparent phonemic recoding by children.

In general, word recognition studies have shown that common words (high frequency) are recognized more readily than are other words. The reason is still disputed although the more recent studies have interpreted the results to indicate that even in word-nonword judgment tasks, subjects search lexical memory for a match. Common words, being more accessible, are processed in less time. The extension of this research to children suggests that processing is no different for unskilled readers and that, in terms of instruction, extensive reading practice should facilitate reading speed.

Word recognition studies on children indicate that an instructional solution is more complex. Generalization of letter-sound patterns play a role in word recognition. Rosinski and Wheeler (1972), Golinkoff (1974), and Lucas (1973) found age-related differences in elementary school children's ability to generalize orthographic and phonological information. By late first or early second grade, appropriate generalizations of consonant and short vowel sounds had occurred. Errors in pronunciation of isolated words have been investigated to identify the kind of word that the child mispronounces, the type of error made, and the relation between pronunciation error and standardized test scores. Lucas (1973) found that, for one syllable words, uncommon words, and words containing two vowels and vowels with an irregular sound were the more difficult to pronounce (e.g., plant as a high frequency word containing one vowel with a regular, short vowel sound was pronounced correctly more often than were words like volt, cairn, or bread). Pronunciation ability was correlated more highly with reading in grade two than in grade five (+.67 with grade two reading achievement, + .43 with grade five vocabulary and + .18 with grade five paragraph meaning). Shankweiler and Liberman (1972) found that the correlation between word pronunciation performance and paragraph fluency varied from .53 to .77.

Pronunciation errors of words in context have shown that prediction also plays a role in word recognition. Goodman (1965, 1976) demonstrates that a substantial number of apparent mistakes "point to a selective, tentative, anticipatory process" of reading (p. 501), that readers are using grammatical and syntactic information as well as graphic information to reach oral pronunciation decisions. Weber analyzed first grade oral reading errors finding that about 90% of all errors were word substitutions (as compared with omissions, insertions, and scrambled order). Biemiller studied first graders' errors over the span of that year of schooling. He detected a change in the nature of errors, particularly an increase in the number of errors that were both grammatically and graphically constrained. He also observed that children who earlier in the year avoided guessing were the better readers in June.

Goodman (1976) argues that grammatical error constraint refutes the notion that reading "involves exact, detailed, sequential perception and identification of letters, words, spelling patterns, and large language units" (p.497). He says that "Reading is a selective process. It involves partial use of available minimal language cues selected from perceptual input on the basis of the reader's expectation. As this partial information is processed, tentative decisions are made to be confirmed, rejected, or refined as reading progresses." (p.498).

In this author's opinion, Goodman's argument for a notion of selectivity is reasonable so long as the reader already has a notion about the graphophonological structure of the language. That is, the disagreement surrounds *sequencing* instruction to foster a selective reading strategy. An analogy may clarify the point. Children are not taught to play the piano by handing them a recording of a piano sonata. Instead, they are laboriously taught to relate the notes on the score to the keyboard. Later as they become more skilled in reading the score, they will look less frequently at individual notes and, in chunking notes into chords or phrases, read and play the music faster, and with more meaning. In that later process, plausible substitutions are not uncommon. The point to be made here is that teaching a child to "break the code" is common practice and need not lead to unnatural note-by-note (or letter-by-letter) reading. If the instruction moves the child beyond the small unit to the larger, more meaningful units, a reader will, by this process, use strategies of selectivity and chunking.

Experimental evidence also casts doubt on Goodman's thesis: there are high correlations at the lower grade levels between reading ability and pronunciation errors (see note, Shankweiler & Liberman, 1972, p.298); Biemiller found an early use of graphically constrained errors marked the better readers; and Mason (1976) showed that an effective way to differentiate good and poor readers was by determining whether, in mispronouncing a word, a child followed vowel-sound pattern regularity. In an important sense, learning to decode appears to be a phonological guessing game. Instruction which makes the phonological structure more apparent to the child is likely to have a facilitative effect on reading. In terms of a skills hierarchy, the thesis here is that the phonological structure should be made available at some early point of reading instruction. Correlational evidence suggests that an emphasis on decoding should precede an emphasis on comprehension. Further, vowel-sound principles are the more difficult and for this reason may be better placed after consonant-sounds in an instructional sequence.

English is a language where graphophonological structure is not readily apparent to the child but, when understood, can be relied on in decoding. A crucial function of reading instruction is to make that structure available as rapidly as possible so that the reader can focus on comprehension.

The adult word recognition studies show that reading practice itself fosters rapid identification. Word recognition errors of isolated words indicate the need for the child to acquire knowledge about the regularity of letter-sound correspondences. Finally, an analysis of word errors in context reveals the child's reliance on text in identifying words. It would seem that all of these means to word recognition should be employed in reading instruction. Whether one or another should be emphasized in initial reading instruction is a skills hierarchy question, but one which has not been addressed as yet by researchers.

Skill Hierarchies and Decoding

Jean H. Osborn

The Programs Selected

In this section we compare the type, sequencing of and recommended teaching procedures for some beginning reading skills in four published reading programs, Lippincott Basic Reading, Ginn 360, Distar^{R}, and the Wisconsin Design. These programs were selected as representative because they specify a relatively clear set of reading skills and include a strong phonetic component in their beginning instructional organization.

In discussing the four programs, we first give an overview of each of the programs which includes a description of the materials, the kinds of students for whom it is intended (and the provisions it makes for varying instruction for slower and faster moving students), the authors' description of the theoretical basis for the reading program they have developed (or their definition of reading), and some particularly salient features of the instructional or organizational structure of the program. We then compare the recommended instructional settings, the role of the teacher across these programs, and the way selected elements are presented and taught in the different programs; this discussion also concerns itself with when a given element is taught, and in some instances if it is taught.

Overview of the programs. The first edition of Lippincott Basic Reading was published in 1963, the first edition of Ginn 360 in 1969. Each is a well known reading series and has been in use with many children in many classrooms. Distar was first published in 1969 and has been known as a program created especially for difficult to teach or "high risk" children. Wisconsin Design, published in 1970, is a skill teaching and management system created to provide a framework to accompany any published program a school is using.

Lippincott Basic Reading (1975, 1964). Glenn McCracken and Charles Walcutt are the senior authors for the primary levels of the Lippincott series. The series, which includes teacher's editions (containing instructions to the teacher about how to teach the lessons), student readers, workbooks, supplementary ditto masters, and text films, is designed to be used in grades one through three, with children of varying abilities.

In the introduction the authors say adequate material is contained in the first grade program to keep bright pupils well occupied. They advise that the slower learning pupils need not master all of the words in the word lists because not all of the words are necessary for successful reading of the accompanying stories.

McCracken and Walcutt propose three meanings of reading. They stress that the meanings do not exclude one another but must be seen as coexisting. Reading-1 is decoding printed visual symbols into the spoken sounds they represent, reading-2 is understanding language both spoken and written, reading-3 is understanding the art and intellect of the language that is accessible only through the printed page.

They believe a reading program should begin by teaching reading-1, and that a program which does not teach decoding skills but teaches by sight words, will not give the child sufficient skills to enter reading-3. They also believe that the faster the skills of reading-1 are taught, the more quickly the child will be able to read all of the spoken language he uses (reading-2), and be ready to enter reading-3, which "becomes the prime source of growth in vocabulary, in language, and in intellect."

In the beginning reading program, children are taught to hear, see, say, and write the graphemic elements as they learn to read. This approach to the teaching of these beginning reading skills encourages the learning of words as meaningful units, while leading children to recognize that sounds they already know are represented by the letters in the words being read. The sounds represented by letters are taught as they sound in known words. This procedure permits the development of an association between the sounds and the symbols which represent those sounds, All of the major consonant and vowel sounds are presented in the first year of instruction, and as these sound-symbol correspondences are presented, the students read words containing them. With the exception of a few "special" words, the students read only words for which they have been taught the component sound-symbol correspondences.

By the end of the first year of instruction, the children have been exposed to over 2,000 regularly (according to the phonetic elements they are being taught) spelled words. Spelling and creative writing skills are also taught as a part of the daily lessons.

Suggestions for the teaching of language concepts are also incorporated in the lesson plans. Examples: how to teach new vocabulary, how to encourage oral expression, how to teach the words essential to following written and oral instructions, and how to interpret pictures.

The first half of the second and third grade materials provides for a review of the phoneme-grapheme associations taught in the first grade. The stories and poems in the second and third grade books present a wide variety of story content and writing styles.

Ginn 360 Reading (1973, 1969). Theodore Clymer is the major author of Ginn 360, and Roger W. Shuy and E. Paul Torrance are the program's linguistics and creativity consultants. The program includes materials for grades one through six, along with a variety of materials which can be used with the series: a teacher's edition for each level which provides teaching suggestions for each lesson, student readers and workbooks, skills handbooks, self-help activities (either in paper pads or duplicating masters), achievement tests, and picture, letter, and word card sets.

The program, intended for use with all elementary school students, has a special section in each of its lesson plans called, "Adjusting to Individual Needs," in which optional activities are given for slower students.

In an introductory chapter Clymer proposes a four-fold definition of reading: (1) decoding, (2) understanding the author's message, (3) critical evaluation of that message, and (4) incorporating the author's ideas into one's thinking and actions. He advocates the use of instructional materials which are broad in scope, and which provide for systematic and sequential development of these four aspects of reading; he claims the Ginn program has been designed to meet these criteria.

The program is organized around ten skill strands that are developed as the students progress through the program levels. These are: decoding, vocabulary, comprehension, creativity development, literary understanding and appreciation, language, study skills, sensitivity to social-moral values, and acquisition of knowledge and information. Also included as part of the program objectives are the development of a sound value system, an appreciation of good literature, and an understanding of the pluralistic nature of American society.

The beginning instructional strategy combines both a sight word and a decoding approach. The students are taught basic words which are taught as sight words. These are described as words that have high utility but which the children have not as yet been taught the skills to decode. The basic words that are introduced are repeated frequently in the stories the students read. The students are also taught phonetic and structural analysis skills that they apply to words categorized as decoding words. A third category is enrichment words which contain words that are necessary for a certain story, but of "low utility" for the rest of the program. These are also taught as sight words. The complete set of phonetic and structural skills that are taught requires three grade levels to teach, implying that during the first three years of the program many of the words the children are taught are basic or enrichment words rather than decodable words. Spelling and writing tasks are also combined with the reading activities. One of the techniques that is stressed is called the "set of diversity," which is defined as "a readiness to seek a solution by diverse routes: when blocked by not obtaining a solution of a decoding problem, then try a different tack." (p. 25)

At the end of the first year program the students have read 331 words, 225 basic, 62 enrichment and 44 decoding.

The goal of the language activities, which are a part of many of the lessons, is the understanding of language and the application of this understanding in reading, writing, listening, and speaking.

As the children progress through the program they read a variety of stories which include, not only those stories of "adventure, fun, and significant facts" written for the program, but also, a broad range of legends, folktales, and stories from traditional children's literature.

Distar Reading. Siegfried Engelmann, Elaine C. Bruner, and Susan Stearns are the authors of the Distar Reading program which has three levels and is typically used in the first, second, and third grades. (The authors, however, strongly recommend beginning Level 1 in kindergarten classrooms.) The program materials consist of teacher presentation books, student workbooks, and reader's and teacher's guides. There are spelling programs for Levels I and II and a test booklet for Level I. The teacher presentation books specify each part of each lesson and tell the teacher how, in the form of a written script, to present the lesson.

Although the program was first directed toward students who might have trouble learning to read, in the 1974 edition the authors state that the program is appropriate for any child--regardless of age--who has not mastered basic decoding and comprehension skills. Included in this edition are a placement test and a set of mastery tests, the results of which provide the basis for the teacher's decision to either skip lessons, progress at the one-lesson-a-day rate, or repeat lessons. As a result of these procedures, higher performing children can complete the program at a more rapid rate than lower performing children. In addition, there is a "Fast Cycle" book containing 70 lessons that is a part of the Level II program. The "Fast Cycle" is designed to review all of the Level I skills for those children entering Level II who need all or part of such a review, and also to be used as a complete beginning reading program for very able children.

The authors of the program believe that reading instruction is not an end in itself but should be considered a process of achieving an end. They believe that "readers" are children who have mastered basic decoding and comprehension skills, and furthermore, know how--when reading in the content areas--to learn, to find, and to concentrate on key parts of a written account. Such children are "readers" in that they know how to read to learn new information. Decoding skills are taught in the first level (although comprehension skills are also included), comprehension skills (as well as more advanced decoding skills) in the second level. The third level, which is titled, "Reading to Learn," has as its basic goal teaching children to find and learn critical information in its science, history, and social science selections.

In the introduction to the Level 1 teacher's guide, the authors say, "The concept underlying Distar Reading 1 is that virtually all children can learn if we teach them carefully. The program therefore attempts to provide the kind of careful instruction that is needed to teach basic skills." (p.1) The Distar teacher presentation books consist of skill teaching activities, called tasks, that are organized into daily lessons. The sequence of tasks is controlled by the script the teacher uses in the teacher presentation book. The intent is: (1) to program a set of skills that will enable children to decode and read words; and (2) to provide for the efficient teaching of these skills.

Beginning reading is taught by simultaneously introducing the students to sound-symbol correspondences as isolated units and teaching them the blending and rhyming skills necessary for combining the correspondences into spoken and written words. Although the program construction is dependent upon the combining of phonic elements, there has been an attempt to include only those skills which are actually essential for decoding words, thereby reducing the amount that needs to be taught. Tasks are constructed making provisions so that the children will master everything that is taught. The modified alphabet used in all of the first level is an aid to this kind of simplification. The alphabet uses only lower case letters, and joins some letters that are frequently pronounced as one sound (for example sh is written as *sh*. Letters making long vowel sounds are marked with a macron (for example, *a* appears as *ā*). Silent letters in words are written smaller than the other letters and the children are taught not to include them in the sounding out process (for example *sick* is printed *SICk*. In addition, only the *sounds* of letters are taught, not the letter names. In the second level all these special orthographic features become regular and capital letters are taught as are letter names.

After eight sound symbol correspondences and a number of blending and rhyming skills are taught, the students begin reading words containing these correspondences. As they learn more correspondences, they learn to read more words. In the early part of the program each word is sounded out before being spoken as a word. About half way through the program the children start reading words "the fast way" and reserve sounding out for unknown words and as a correction procedure to reread words that have been misread.

About a third of the way through the Level 1 program students begin to read word phrases. It is at this point that comprehension activities begin. By the end of the Level 1 program the students have read 440 different words and are reading these words in two page stories. Writing and spelling activities are included in the lessons.

(Language competency is considered as an essential part of reading comprehension. There are companion *Distar Language* programs which include oral instruction in language concepts and statements commonly used in classrooms and textbooks. These programs also provide for the teaching of a large body of common information, and of the language and processes used to solve logical problems).

The Level 1 stories and most of the Level 2 stories are narratives of increasing length. "Rule" stories which concentrate on logical and deductive reasoning, and informational selections are introduced in Level 2. Most of the selections in Level 3 are in three content areas: science, social science, and history.

Wisconsin Design for Reading Skill Development (1974, 1973, 1972, 1970).

Wayne Otto and Eunice Askov are the major authors of the Wisconsin Design. The program is to be used as an instructional and management framework to accompany an already established reading program in kindergarten through sixth grade. The materials that have been developed include lists of essential skills (grouped into six areas), criterion-referenced tests, profile cards for the systematic grouping and regrouping of pupils, resource files of published materials, and teaching procedures keyed to specific implementation of three of the skill areas, along with a book for administrators and supervisors of the program, Rationale and Guidelines (Otto & Askov, 1973).

The program is designed to be used with all elementary students. It's assessment and evaluation procedures have been developed so that children will be moved out of a skill development group when they demonstrate mastery of the skill being taught. The chart in Rationale and Guidelines (p. 15) which matches skill area levels with grade levels indicates that slower children will move less rapidly through the skill levels. In the overview of the program (p. 1), the authors have identified four fundamental purposes for the Wisconsin Design:

1. To identify and describe behaviorally the skills which appear to be essential to competence in reading.
2. To assess individual pupil's skill development status.
3. To manage instruction of children with different skill development needs.
4. To monitor each pupil's progress.

They feel skill development is essential to success in reading, that teachers should have an organized approach to the teaching of reading, and that this approach should include identification of essential content, statement of objectives, assessment, identification of appropriate teaching/learning activities, and evaluation. They fit these elements into the framework of the Wisconsin Design and add a management system which provides for the systematic monitoring of individual student progress through the program.

The skill areas they have identified are: word attack, comprehension, study skills, self-directed reading, interpretive reading, and creative reading. In three of the skill areas (word attack, comprehension, and study skills), specific behavioral objectives have been written for each skill. Descriptive objectives have been written for each skill in the remaining areas. The skills contained in each of the six areas are arranged so that they correspond to traditional grade levels. The authors explain that, because of the traditional grade-level basis of so many schools, they have arranged the skills by grade level, but that within a given grade level, the skills are not necessarily to be considered hierarchical.

Oral language skills included in the comprehension skills list for the first year program are: identifying a topic from a picture, determining the first or last event in an oral selection, using logical reasoning to predict outcomes with information given orally, and reading for detail and deriving meaning from the important details in a simple written-oral selection in the active voice. Other more advanced logical concepts appear in the second and third year lists.

As the students advance through the levels of the Wisconsin Design, the type of reading materials they encounter is dependent upon the reading series used in their classrooms and upon their teacher's use of supplementary reading materials to meet the requirements of each level of the program.

The instructional procedure. The explicit instructional procedures presented to the teacher by the Lippincott, Ginn, Distar, and Wisconsin Design teacher's guides vary from highly specific to semi-specific, to general to none.

The Distar program gives the most detailed instructions of the four programs discussed. The instructions include: the number of groups a usual classroom should be divided into for instruction (three), the exact time requirements for reading (35-40 minutes a day for teacher instruction of groups, 20-30 minutes a day for children's independent work, 20 minutes a day for work check period, and 10 minutes a day for spelling), the physical setup of the instructional setting (including where to seat the most difficult to teach children), and optimal sizes for different ability groups (the most able children should be combined into the biggest group, the least able into a group of no more than five or six).

The Wisconsin Design recommends a specific method for identifying skill development groups. The procedure involves giving the WTRSD (Wisconsin Tests of Reading Skill Development) and recording the results on profile cards kept for each student. The WTRSD is used to find the ability level of the student, the profile card is a summary of the WTRSD. Teachers sort the profile cards with sorting skewers (the profile cards are coded with open and closed holes punched around the edges) to find the pupils that have mastered the grade level skills, and the rest of the pupils are sorted again to find specific difficulties. The child is placed into a specific skill subgroup along with other children having the same problems. The teacher is advised to spend two hours per week working on the Design's word attack skills, two hours per week on study skills, and two hours on comprehension skills. The Design recommends that a student should be moved out of a group whenever his performance is adequate, thus individualizing the student's progress as much as possible. Three plans for time allotments are suggested: daily, three times a week, and twice a week. Each is a total of six hours per week. The teacher decides what to teach when students advance, but the overall instructional setting is not specified as precisely as in the Distar program.

The Lippincott program is designed to work with whole class instruction, small group instruction, partner, or individualized patterns. The teacher is advised to organize the class according to the requirements of local administrative policies, as well as on the basis of his or her evaluation of the abilities and competencies of the students in the class. One suggestion is that teachers begin the year with whole group instruction, and change to small group and individualized instruction as pupil abilities are identified.

The Ginn 360 does not, in its introductory chapters or in its teacher's guides, make any recommendations for instructional settings in which to teach the reading program.

The role of the teacher. Not surprisingly, the role of the teacher is very specifically described in Distar and more generally described in the Wisconsin Design, Lippincott, and Ginn 360.

Distar. In the introduction to the Level I program, the authors explain and justify the kind of program the teacher control used in the Distar program.

> ... A final aspect of the program control used in Distar Reading has to do with the teacher's behavior. What the teacher does and says is specified. The teacher is not given general instructions; rather, she is provided with the exact words that she is to use when presenting each of the tasks. Her other behaviors--pointing, signaling the group to respond, and the like--are specified precisely. The program indicates where the children are likely to make mistakes and precisely what the teacher should do to correct each mistake.
> The reason for the attention to detail in the design of the program is that details make a difference. Well-intentioned teachers frequently confuse children, particularly lower-performing children, with explanations that are beyond the children's understanding. Poorly sequenced tasks may further confuse the children, delay their learning, and perhaps result in their losing interest in reading.

The *Distar Reading I* program prevents these problems from dedeveloping. If the teacher follows the program carefully, she will be able to teach children who would be likely to fail if she used less care. (p.1)

Many of the responses within a lesson are group responses. All of the children answer at once. One reason for this strategy is so the teacher will be able to find out if all the students can respond correctly and not be confined to an assessment of the group's mastery by the answer of the student who happens to speak first. Another reason is, with group responses, (as compared to a series of individual responses,) *all* of the children in the group get a lot of practice, and are actively engaged in the learning process. Individual turns are used to test individual students at the end of the tasks and also for reading stories. The word "signal" in the tasks indicates when the teacher is to prompt the group's response. To signal, the teacher either touches an appropriate letter or word in the teacher presentation book, or, for oral tasks, claps or motions with her hand.

Correction procedures have been devised for those steps in a task in which errors are most likely to occur. A correction procedure for a given error appears for only two or three days, after which the teacher is expected to have mastered the procedure and to use it whenever needed in subsequent tasks.

The teacher's guide emphasizes the importance to the teacher of practicing tasks, signals, and corrections. The authors point out that the successful teacher of the program is one who can: use clear signals, evaluate when the children have reached an acceptable criterion of performance and can then move on to the next task, pace tasks appropriately, reinforce the children's good performance, and correct errors skillfully and efficiently. They feel the ability to correct errors marks the difference between a teacher who can teach all of his or her students or only some of them.

Ginn 360. The role of the teacher is broadly conceived in the Ginn program. In the introduction the authors state,

> Meeting the individual needs of pupils is one of the greatest problems of classroom teachers. Reading 360 is rich with suggested activities, procedures, and techniques for pupils who need special help. Whenever possible, children learn to do for themselves, thus freeing the teacher to work with individual pupils. The teachers' editions, organized for efficient and effective teaching, provides numerous concrete suggestions for the teaching of reading. Reading 360 offers the teacher options for achieving the goals of the program. (Level 2, p. 25)

The authors of the series have made an explicit effort to introduce research in linguistics, creativity, and reading into the program. Research in language and word structure, in creative thinking and in strategies for the rate and method of teaching decoding skills has influenced the construction of the activities that make up the lesson plans. The activities in the lesson plans provide the teacher with specific suggestions as to how to present the skills being taught in the lesson. The teacher is not to use all of the activities in each lesson, but rather to select those activities which s/he anticipates are needed by the children. A section called, "Adjusting to Individual Needs," suggests different instructional principles and procedures for pupils who have special problems.

There is no recommended amount of time to be spent on each lesson. The rate at which students proceed will be partly determined by the number of exercises needed by the students. Each lesson is divided into four parts: Preparation for reading, Reading the story, Developing reading skills, and Adjusting to individual needs.

Lippincott. Although the role of the teacher is only generally described in the introduction to the teacher's editions, the lesson plans themselves contain many instances of very specific directions for teaching different parts of a lesson. There are other, less structured activities suggested as well. This range, from specific to general, is consistent with the role of the teacher as conceived by the Lippincott authors, who say:

> The suggestions provided are usually more than the teacher has time to use. Therefore, they should not be viewed as mandatory or prescriptive. Instead, the teacher, with intimate knowledge of the abilities of her class, will be able to draw from the suggestions those materials most suitable for her class or teaching group.

> Materials in the Teacher's Editions are carefully balanced to provide for full utilization of multisensory approaches to learning. Exercises involving auditory discrimination are balanced with exercises involving visual discrimination so that close associations may be made. In addition, there appear exercises utilizing kinesthetic activities for further reinforcement. Suggestions for motivating vocabulary building, word analysis, creative writing, correlations of auxiliary materials, guidance of silent and oral reading are readily and appropriately placed. (p. xxii, Book A)

The teaching suggestions in each lesson are organized into a sequence which include all or some of the following: Building Linguistic Skills Procedure, Guiding Reading for Comprehension, and Suggestions for Further Activities and Enrichment. There are not specific directions for the amount of time to be spent on any section, although in order for students to finish the first year program in a school, it would be necessary to do about one lesson a day.

Wisconsin Design. In Rationale and Guidelines, Otto and Askew define the role of a teacher using the Wisconsin Design:

> Most importantly, teachers are diagnosticians as well as teachers. They assess skill development not only with WTRSD but also daily while observing children's work in class, or assignments, etc. They are responsible for assessing skill development in all six areas and for providing instruction in the skills that children lack. Teachers

also have responsibility for teaching skill groups. They report on a regular basis to the unit leader which children have passed assessment during skill group instruction.

Finally, teachers should participate in compiling entries for the teacher's resource files. Materials that teachers use in teaching skill groups should be filed in a central location so that they may be used by other teachers at all levels. (p. 37 in Rationale and Guidelines)

The need for schoolwide and district organization, in-service training, the scheduling of work and planning sessions, and the coordination of the services of the building principal, the reading consultant and unit leader are all stressed as important components of the Wisconsin Design. Unit leaders serve as coordinators of a school's various reading groups, assume responsibility for training the staff, coordinate the building's resource files of activities for teaching skills, and help teachers and aides maintain the records of student progress.

The authors believe that, "Viable reading programs are best worked out at the local level," and have not attempted to describe a total instructional program in reading. Nor have they prescribed instructions for skill development. They state, "Our assumption is that skill development is best facilitated when teachers accept the responsibility for directing learning experiences which suit their pupils' characteristics and needs." (p. 3) Within the classroom, the emphasis is on planning instruction so that each child can learn in the way that is most appropriate for him as an individual.

The Treatment of Some Specific Skills Across Programs

To compare the instructional approaches to the teaching of beginning reading skills in these four programs, we have selected a group of separate skills, ranging from the introduction of sound symbol relationships to the teaching of punctuation. We have attempted, in a series of tables, to show for each program some of the specific skills that are introduced, when they are introduced (in some instances, the rate at which they are presented), and how they fit into related preceding and subsequent skills. Some of the similarities and differences that occur across programs become quite apparent in these tables.

The sequence of the primary teaching materials used in each of the programs is displayed in Table 1, Division of Lippincott, Ginn 360, Distar and Wisconsin into Quarters. In the left-hand column is the name of each of the programs. The three remaining major column divisions are Year 1, Year 2, and Year 3. Each of these columns is divided into quarters and within each quarter is the program's designation for the book or books that occur within that quarter. By dividing the instructional materials into quarters and numbering the quarters sequentially through the third year, it is easier to compare what is occurring and when it is occurring across programs rather than having to refer to a confusing array of non-parallel but specific book titles and level designations. (The division into quarters for each program is approximate and depends upon the rate

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Insert Table 1 about here
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of progress being made by the students and teachers in any given program. It should be noted that "grade level" is relative to the ability of students being taught. For most children, these twelve quarters require three school years of instruction, typically first through third grades. The authors of each of these programs, however, point out that different children progress through the program at different rates; some will require less time and some more time. It is also to be noted that in some schools regular reading instruction (as opposed to reading readiness instruction) begins in kindergarten, and that in these schools most of the children who begin the Year 1 materials in kindergarten complete the Year 3 materials at the end of second grade.

Pre-reading or reading readiness programs are included in the table if they are a part of the published program. The recommended readiness program for the Lippincott series is, Beginnings; but since it is not a part of Lippincott Basic Reading, it is not included on the chart. There are, however, a number of readiness activities included in the first quarter Lippincott book. Level 1 of the Ginn series is the readiness program. It appears in the first quarter, along with Level 2, although many students begin instruction in Level 2 (which reviews most of what is taught in Level 1). While there are no supplementary readiness materials used in the Distar program, readiness activities are a part of each of the first quarter's lessons. The Wisconsin Design readiness Level A, which is recommended to be used in kindergarten, is included with Level B in quarter 1.

The comparisons of elements within these four programs are displayed on a series of tables which begin at page 90; preceding this is a discussion of some of the major differences across programs. A list of those decoding and other related skills and the tables in which they appear follows:

1. Division of Lippincott, Ginn 360, Distar, and Wisconsin by quarters (see above).
2. Location of the letter and sound correspondences that are explicitly taught in the first twelve quarters.
3. Location of beginning letter-sound skill instruction for
   (a) Single consonants that record invariant or variant sounds
   (b) Consonant clusters and consonant digraphs that record invariant and variant sounds
   (c) Single vowels that record long and short sounds
   (d) Vowel effect from the letters r, l, w
   (e) Vowel digraphs and diphthongs
4. Location of beginning instruction in some concomitant skills.
   (a) Plurals, prefixes, suffixes, past tense (ed)
   (b) Blending, syllabication, compound words, contractions, possessives
   (c) Synonyms, antonyms, homonyms

5. Comparison of special types of words to all words encountered at the end of first and second years.
6. Punctuation and capitalization skills.
7. Word count at the end of the fourth and eighth grades.
8. Analysis of stories.

Decoding Instruction: What, When, and How

An examination of the tables will show that each of the programs does identify a set of discrete phonetic skills, (along with other related word and structural analysis skills,) but that the sequence for the presentation of these skills varies across programs.

Although each program includes a set of skills, and a sequence for teaching them separately as well as in combination, there is very little similarity across programs in what skills are taught, when skills are taught, and how they are sequenced. Examination of the teacher's guides and of the student materials also reveals that there is a wide range of tasks and materials that have been created for the teaching of these skills, and that these too vary enormously across programs. This examination also reveals a significant difference in each program's conception of the role the teacher fulfills in the teaching of the skills.

What skills are taught and how? What is of primary interest is that some skills that are considered essential in one program are barely emphasized or not taught at all in another. For example, Both Lippincott and Distar provide for the teaching of blending skills. In contrast, Ginn makes very little provision for the teaching of either sounding out or blending skills and Wisconsin does not include these words to describe the skills on any of its lists. Even though both Lippincott and Distar teach blending skills explicitly, how the skills are taught and the recommended amount of time devoted to them varies significantly. In Distar a lot of instructional time is given to teaching children the skills of first sounding out and then blending together the sounds in both spoken and written words. In Lippincott the teacher is cautioned, "at no time do you have children 'sound out' the word." Instead the teacher is told to say a word, and then to say its sounds for the children. The Lippincott authors believe that the correct procedure is to teach words as whole units and to lead children to see how the sounds they know occur in words and are represented by the letters in them. On the other hand, the Distar authors believe that practice in sounding out words is critical to the children's ability to sound out new words and to correct misread words.

Another example of a skill that is a major element of one program and not found in the others is the use of graphemic bases. Children in Ginn 360 are explicitly taught and expected to remember and build words from a series of graphemic bases (vowel and consonant combinations which are joined with beginning single consonants and consonant clusters to form words). None of the other three programs specifically teaches graphemic bases, although the rhyming word sequences that are found frequently in Distar, and less frequently in Lippincott, could be considered a use of this principle.

How what is taught is used. Each of the programs teaches the principles of sound-symbol correspondence; that is, the children are taught the sounds that are associated with specific letters and letter combinations. It must be added, however, that the application of these principles to the total instructional strategy of the program varies significantly across programs.

Essentially all the words used in the first eight quarters of the Distar and Lippincott programs are decodable according to the correspondences that have been taught. In the Ginn and Wisconsin programs, however, a large number of words that are not decodable are introduced starting from the first day. In Ginn the children begin by learning basic (or sight) words which do not adhere to the sound symbol correspondences they are also being taught. The sound-symbol correspondences they are learning are not critical to the words the children read in the first three quarters. It can be assumed from the large number of sight words that are a part of the Wisconsin Design word attack skill list and the ordering of the consonant and vowel sound symbol correspondences prescribed in the skill lists that this approach to the parallel teaching of sight words and sound-symbol correspondence is a strategy of that program as well.

This "sound-symbol plus basic or sight-word" strategy contrasts directly with the use of sound-symbol correspondence in Lippincott and Distar. In these programs the use of sound-symbol correspondences forms the principle strategy for identifying most of the words the children read in at least the first eight quarters of the program. The vocabulary is controlled so that the children read words which contain only those sounds they have been taught.

However, even Lippincott and Distar differ radically in the number of correspondences introduced, as well as the rate and sequence of their presentation; there are 103 taught in the first four quarters of Lippincott. While all of these are reviewed in quarters five through twelve, no new ones are presented. In Distar, forty sound-symbol correspondences are taught in the first four quarters, and only five more are introduced in the next three quarters.

Concomitant skills (for example, rhyming, blending, left to right sequencing, and structural analysis,) which permit the students to use the sound-symbol correspondences they are being taught also vary--in kind, in number, in emphasis, and in the rate and order of presentation.

Order of presentation. The order of presentation of the sound-symbol correspondences and the concomitant skills is definitely controlled by the instructional strategy of a program. If, as in Lippincott and Distar, the correspondences being taught form the primary basis for the students' ability to read the words they see, this principle naturally influences the initial order in which sounds and vowels are taught.

McCracken and Wolcott, the *Lippincott* authors, explain their choice of the beginning correspondences in their introduction:

> Why our particular letter order? We introduce the five short vowels in Book A because they permit the construction of short words free from such complexities as digraphs (*ea*, *ee*, *ei*, *ai*, *ay*, etc.) and the silent or signal *e* of such words as *late*. Every word has a vowel; so they are particularly useful and needed. We follow the first vowel (*a*) with a consonant (*n*) so that we can immediately have a word to work with, in the manner we have set forth. With the second consonant (*r*), we have four words and a little story; and the third consonant gives us four more words. The last of these is *and*, with the first blend. (Book A, p. xiii)

The first correspondences presented in *Distar* are chosen for equally functional reasons, but they are a smaller set. There is considerable overlap and the proportion of vowels and consonants is about the same for each program. Whereas *Lippincott* presents *a*, *n*, *r*, *d*, *u*, *m*, *p*, *i*, *s*, *o*, *t*, *e*, *g*, *c*, *h*, *f*. *Distar* chooses *a*, *m*, *s*, *e*, *r*, *d*, *f*, *i*, *th*. The need for the introduction of vowel sounds in these two programs is obvious. It is of interest that continuous consonants are presented first, and that there are more continuous sounds than stop sounds in each set.

Across these four programs, it is easy to conclude that the strong reliance upon easily decodable words does affect the choice of sound-symbol correspondences taught. For programs which use basic or sight words, the choice of which sounds and symbols are taught and in what order they are presented does not have to be strongly controlled.

Teaching the skills. Not only does the use of sound-symbol correspondence as a strategy for teaching children to read words differ across programs (as do the kind, number, rate, and sequence of correspondences taught), the instructional tasks created for teaching those correspondences also differ widely.

There is significant variation in what the teacher does to teach the relationship between sounds and letters, and in whether the children are taught to identify the letters by letter names, by sounds, or by sounds and letter names. In Distar the children are introduced to sound-symbol correspondences by being taught to identify a letter as an individual element (in isolation) and not as a part of a word. They are taught to identify letters by the sound the letter represents, and not by the name of the letter. During the first six quarters, they see only lower case letters. Letter names and capital letters are not taught until the sixth and seventh quarters.

In Lippincott the students identify the letter and sound of a beginning letter in a word the teacher says. The teacher then says other words that begin with that sound. The children repeat each word. The teacher then presents discrimination exercises in both the visual and auditory modes. Lower and upper case letters are introduced in the same lesson.

Both Ginn and Lippincott introduce sounds as they occur in words. But the programs differ as to when they teach children letters that correspond to the sounds that appear in the beginning, medial, or final positions of words. Lippincott introduces words with the target sounds at the beginning and in the final position in the same lesson. Sounds in the medial position are introduced about half way through the first quarter. Ginn has children identify sounds heard at the beginning of words in the first quarter and introduces sounds in the medial and final position at widely separated points in the second and third quarters.

Thus in three of the programs, the instructional strategy for introducing sound-symbol correspondences involves sounds being presented as elements of words the students hear. Furthermore, the points at which the children have to listen for sounds in words (beginning, medial and final) differ across these three programs. In the remaining program (Distar), the sounds are not introduced as elements of words but as separate entities to be later combined into words.

Specific Skills: A Detailed Comparison of Programs

The tables which delineate selected skills appear below. They document some of the previously discussed similarities and differences across programs and present some new comparisons. In addition, examples of instructions to teachers are sometimes included.

Letter and sound correspondences in the first twelve quarters (Table 2). The nature of the phonetic emphasis and the instructional strategy of each of these programs is perhaps best revealed in Table 2, which summarizes the letter and sound correspondences taught in the first twelve quarters.

Insert Table 2 about here

Lippincott. There are 103 sound-symbols taught in the first four quarters and systematically reviewed in quarters five through twelve. In the first four quarters the students are introduced to the sound correspondences for all of the words they learn to read with the exception of thirty "special" words that are presented before their linguistic elements are taught. In the first quarter the sound-symbol correspondences for the five short vowel sounds and for eleven consonants are presented. Of these consonant sounds nine are invariant, two are variant, five are continuous sounds, and six are stop sounds. By the end of the first quarter these sounds have been combined into 194 words. In the second, third, and fourth quarters, the sound-symbol correspondences for the remaining vowels, consonants, and vowel and consonant digraphs are presented in rapid sequence. By the end of the fourth quarter the students have been exposed to all of the sound-symbol correspondences essential to the reading of most English words. If they have successfully read all of the word lists and stories that are in the student books, they have combined these sounds to read over 2,000 different words.

Ginn 360. One hundred thirty eight sound-symbol correspondences used in English words are taught over twelve quarters. However, the sound-symbol correspondences that are being taught are not the only basis for selecting the words the children learn to read. The initial set of words includes some basic words which are presented as sight words. After students have read some basic words and have been taught a number of sound-symbol correspondences, some decodable words do appear in their stories, although not until the third quarter.

All of the 32 words the children learn in the book used in the first quarter are learned by sight and are not decodable. This is not surprising, since vowel sounds have not as yet been introduced.

By the time the students have completed the fourth quarter materials, they have encountered 41 words that they can decode. The rest of the 331 words they have read are either basic or enrichment words. Following the vocabulary list, which appears at the end of the fifth quarter book, is an additional list of words that have not appeared in the stories the students have read, but which they should be able to decode on the basis of the phonetic skills they have been taught.

In the first quarter 20 sound-symbol correspondences are taught, all of which are consonants. Of these consonant sounds, all but three are invariant. The first seven sounds taught are stop sounds; of the remaining sounds, eleven are continuous sounds and three are stop sounds.

Part of the strategy for teaching decoding involves instruction in graphemic bases, described in the Level 2 teacher's guide as "a vowel letter or letters, with a consonant letter or letters following, such as at" (p. 14). Four graphemic bases are taught in the first quarter of the program, and others are introduced in subsequent quarters. As the children learn these bases, they combine them with beginning consonant sounds, digraphs, and clusters. By the end of the twelfth quarter, the students have been taught 83 graphemic bases.

Distar. There are 40 sound-symbol correspondences taught in the first four quarters and five additional ones in the next three quarters. As in Lippincott, the students read only words that contain the correspondences they have been taught.

In the first quarter nine correspondences, three vowels (two short and one long), and six consonants are introduced. Of these consonant sounds five are invariant, one is a consonant digraph, one is a stop sound, and the rest are continuous sounds. By the end of the first quarter, the students have read only 35 words. By the end of the fourth quarter, the correspondences taught permit the reading of the 421 words that appear in the teacher presentation book and in the student materials.

With the exception of upper case I taught in the third quarter, all of the symbols presented are lower case. The macrons over long sounds of the vowel symbols that appear on the chart above also appear in the words the children read during the first six quarters of the program.

Wisconsin Design. Although the list of word attack skills does not specify which consonant sounds should be taught in the first quarter, it does indicate the consonant blends and the short vowel sounds that should be introduced in the second and third quarters. Long vowel sounds are not introduced until the fifth quarter, whereas in Lippincott, Ginn, and Distar varying numbers of long vowel sounds are presented during the first four quarters. (It is assumed that, if these sounds have already been presented in the basic reading program the Wisconsin Design is accompanying, they will be reviewed when they appear in the skills list.)

Location of beginning letter-sound instruction (Tables 3a - 3f).

a. Consonants that record invariant vs. variant sounds. Both the number and order of appearance of single consonants differ markedly in Lippincott, Ginn, and Distar. (The order of the sounds considered invariant is not specified in the Wisconsin Design skill list.) Lippincott teaches 8, Ginn 13, and Distar 4. (It should be noted that although s, c, and t can record other sounds, in the first four quarters of the program they are treated as invariant in Distar and are taught as representing one sound each.) Table 3a allows a comparison of the programs.

Insert Table 3a about here

Lippincott. The first two invariant consonant sound-symbol correspondences taught are for the letters n and r, (n/n is the second correspondence taught, the short vowel /a/a is the first.)

The procedures recommended in the teacher's manuals for the teaching of the first correspondence are typical of those for teaching many of the sound-symbol correspondences in the first four quarters. The exercises for the teaching of /n/n include having students:

1. Associate the word nest with a picture of a nest, and listen for the beginning sound of that word as the teacher says it

(Auditory/visual association of picture, word, beginning sound).

2. Hold up cards with lower case n printed on one side, upper case N on the other while the teacher reads from a list of words that begin with n and with a, the correspondence that has been taught in the previous lesson (Auditory discrimination and associating the letter n with words that begin with /n/n).
3. Identify which one of a set of three words begins with n and repeat that word--five sets are presented (Auditory discrimination and verbal practice).
4. Hold up cards with a, A, and n, N, printed on them for words that begin with a or n (Auditory discrimination and associating the letters a and n with words that begin with a and n).
5. Identify all the a's and n's in a display containing lower and upper case forms of those letters and other letters matching letters in another display, and crossing out letters which don't belong in a third display (Visual discrimination).
6. Stand, when they hear a word that ends in /n/, stoop or sit when they hear a word that does not end in /n/ (Auditory discrimination).
7. Practice writing n and N; saying /n/ and nest while writing the sound (Writing practice and sound, letter, and word association).

There are variations and extensions of these exercises used to present the other consonant sound-symbol correspondences taught in the first three quarters.

Ginn. The two invariant consonant sound-symbol correspondences introduced are /b/b and /l/l. As in Lippincott, there are a variety of exercises involving auditory and visual discriminations, auditory-visual associations, and writing practice. In these exercises the students:

1. look at a word card with Bill written on it, read it, listen to the teacher read it, look at a picture of a boy named Bill in their text, talk about his identifying features, and answer other questions about the picture (Basic word identification and word meaning questions).
2. identify pictures of objects beginning with /b/, and listen for the beginning sound of each of the objects (Auditory discrimination).
3. decide if a list of nine words the teacher says (beginning with b) begin with the same beginning sounds they heard in the previous exercise (Auditory discrimination).
4. listen to sets of two words, one of each beginning with /b/ and repeat the words that begin with the same sound as the word Bill (Auditory discrimination and verbal repetition).
5. practice writing the letter B in front of the letters ill in their books (Writing practice and word completion).
6. listen and watch the teacher as she reads the word Bill, and passes her hand under it from left to right; identify that the capital letter at the beginning of the word stands for the

sound heard at the beginning of Bill (Word identification, left to right sequence, letter and sound association).

7. look at letter card B and listen for /b/ beginning proper names as the teacher reads sentences; watch as the teacher writes each name that begins with /b/ on the chalkboard and underlines the capital B in each word (Letter and sound association).
8. identify pictures of objects and compare the initial sounds of their labels with the sound at the beginning of Bill (Picture identification and auditory discrimination).
9. listen to sentences the teacher reads and repeat the children's names that begin with the sound they hear at the beginning of Bill's name; listen again to the sentences and repeat all the words that begin with /b/; look at B at the beginning of the proper nouns the teacher has written on the board and at a list of nouns not capitalized; identify the letter (upper case or lower case) that stands for the beginning sound of each word; repeat each word after the teacher has read it; go to the board and underline the beginning letter of the proper nouns (Auditory discrimination, verbal repetition, upper and lower case discrimination).
10. identify objects in the classroom that begin with /b/ and names of children in the class that begin with /b/. Discuss which begin with capital B (Auditory discrimination, lower and upper case discrimination).

11. play a game with the sentence "When Bill went to Boston he bought a balloon;" substitute different objects beginning with the sound /b/ for balloon (Verbal practice and auditory discrimination).

These and other similar exercises are used to present consonant sounds.

It should be noted that whereas in Lippincott the children are to identify sounds only at the beginning of words, in Ginn they do not identify consonant sounds at the end of words until the second quarter. Both programs introduce lower and upper case letters in the same lessons. (Although the rule that capital letters are used for people's names is not discussed in the Lippincott /n/n correspondence exercises, it was introduced in the previous lesson, which taught /a/a).

Distar. The first two consonant sound-symbol correspondences taught are the continuous sounds, /m/m and /s/s. (Although the letter s is a variant sound, it is treated as an invariant sound--words in which it takes the /z/ sound are treated as irregular words). The /m/m correspondence is the second one taught (the short sound of a was first).

In Lippincott and Ginn 360 sounds are introduced as they occur in spoken and written words. In Distar sounds are introduced as individual units, not as parts of words, and are identified as sounds, not by letter names.

In the exercise in which the sound-symbol correspondence for /m/m is taught, the students:

1. watch the teacher point to and touch the letter m and listen to her say "mmmmmmmmmm" (Letter and sound association).
2. in response to the instruction, "When I touch it [pointing to the letter], you say it. Keep on saying it as long as I touch it," say "mmmmmmmmmm" and repeat saying the sound each time the teacher touches the letter (Letter and sound association).
3. identify the letters a (taught in the previous exercises) and m in the same way as in the above exercise (Letter and sound association, and discrimination).
4. identify the letters /a/ and /m/ and indicate that a picture of a baby is neither /a/ nor /m/ (Auditory and visual discrimination).
5. write and say the sound in a workbook (Writing practice).

The teacher is instructed to hold continuous sounds for two seconds, and to require the students to say a sound for as long as the letter is being touched, also two seconds. This is done so the students will be able to hear and say the sound for a long time, and so that when they sound out words, blending the sounds together will be easier. Stop sounds are held for only an instant.

These are basic procedures used for all sound-symbol correspondences taught in Distar. Later sound-symbol teaching activities include: cross out games, in which a student crosses out a letter after it has been correctly identified; races, in which the teacher and the group see who can identify a letter first; firm-up tasks, where sounds that are easily confused are paired and practiced; and review pages, on which sounds taught before a given lesson are displayed.

Wisconsin Design. There is no suggested order for the introduction of invariant sounds in the Wisconsin Design, although the list does indicate that the beginning and ending consonants are to be taught in the first quarter. Nor are there any recommended teaching procedures. How the teachers would teach these sounds and in what order would be determined by the program being used in the classroom.

We now turn to single consonants that record variant sounds (indicated by a circle on the chart). Examples of such consonants include the letters c and g which can take on "soft" or "hard" sounds. The discussion is organized around where and how these sounds are taught, and if they are treated as variant.

Hard g and c are introduced in the first quarter of both Ginn and Lippincott. They are introduced in exercises very similar to those used for introducing invariant sounds. The soft sound of c and g are introduced in the third quarter in Lippincott; in Ginn the soft sound of c is taught in the fifth quarter and that of hard g in the sixth quarter.

Of interest is when and how the soft sounds are presented in these two programs. In Lippincott the soft sounds of c and g are introduced in the third quarter, and it is explained that c can spell the same sound as the letter k (hard c) or the letter s (soft c). The children then study words with soft *c* and learn that *ce* and *ci* and *cy* usually signify a soft *c*. Finally they do some soft *c*, hard *c* discrimination exercises. (When soft *g* is introduced in a set of similar exercises, it is related to soft *c*). *Ginn* presents soft *c*, hard *c* word discrimination exercises when it introduces the soft *c*, but does not pair the soft *c* with the vowels with which it is frequently associated. These relationships are introduced almost a quarter later, when soft *g*, hard *g* are taught and the pairing of soft *g* with the vowels *i*, *e*, and *y*. (Hard and soft *g* is not related to hard and soft *c*).

Distar explicitly teaches only the hard sounds of *c* and *g* and treats words in which the soft sounds of these letters occur as irregular. In the *Wisconsin Design* hard and soft *g* and *c* occur in the fifth quarter.

b. *Consonant clusters and blends (Table 3b)*. The numbers of consonant clusters and digraphs that are explicitly taught in the programs range from the four digraphs and no clusters in *Distar* to the 9 digraphs and 38 clusters in *Ginn*. Obviously, the attitudes of program authors toward the need for the explicit teaching of consonant clusters and consonant digraphs differ markedly. In *Distar* the digraphs are represented by joined letters. One is taught each quarter. Lippincott teaches fourteen digraphs, and presents them as sounds represented by two letters.

Insert Table 3b about here

Neither Distar nor Lippincott explicitly teaches consonant clusters. The Distar authors feel that the regular sounding out process taught in the programs permits children to deal with consonant clusters as they do with consonant vowel sequences. They do, however, recognize the difficulty some children have with these letter combinations, and starting in the fifth quarter include many words containing a variety of consonant clusters in word practice exercises. The Lippincott authors state, "since a child can hear a blend as easily as a syllable, we do not approach blends as special problems or as items that have to be presented individually as blends." (p. xiii) In this program clusters are taught as they occur in words: the word is said, the sounds are said, and then the letters are associated with the sounds.

The variant th sound is taught as voiced in Distar, and treated as irregular when it occurs in words in the unvoiced form. In Lippincott, it is explicitly taught in both the voiced and unvoiced forms in one lesson at the beginning of the third quarter. Ginn introduces the unvoiced th early in the fourth quarter and associates the voiced th with it at the end of the quarter.

Ginn, which teaches the largest number of clusters and digraphs, does not introduce them (with the exception of ll and ss in the third quarter) until the fourth quarter, where tr is the first cluster introduced. Those that follow in that quarter are for a variety of first and second letter combinations whereas the clusters introduced in the second quarter of the Wisconsin Design combine initial consonants with l and r only.

c. Single vowels that record long and short sounds (Table 3c). In Lippincott, the first five vowel sounds taught in the first quarters are the short sounds of a, u, i, o, and e. Long sounds are taught in the second and third quarters. The first correspondence taught is that of /a/a. The exercises are similar to those used for teaching consonants. The students listen to and say words that begin with a, discriminate a beginning spoken words from other beginning sound spoken words, associate the written letter a with spoken words that begin with a and pick out a beginning written words from other beginning letter written words. They also practice writing a and A.

Insert Table 3c about here

Ginn. The graphemic bases ill, ide, and ides are presented in the first quarter and vowels as separate entities are not introduced until the second quarter when the long and short sounds of i are presented. Short i is taught as a sound to be heard in the medial and the beginning positions of a list of words read by the teacher. Then the word ride is read and the terms unglided for the short sound and glided for the long sound are introduced and exercises which teach the distinction follow. This is the lesson from the teacher's guide:

> Establish the fact that the vowel sound in the word Bill is stable and does not glide from one sound to another. Demonstrate this fact by asking the children to hold their chins as they repeat a series of words, some with the glided vowel sound

/*ay*/ and some with the unglided vowel sound /*i*/. Through this experience, the children should observe that the chin hardly moves when a word containing an unglided vowel sound is spoken. The following words are suggested for this purpose:

my
kind
bright
bit
tick
nine
fly
chip

(Level 3, p. 84)

Distar. The vowel sounds taught in the first quarter are short *a*, long *e*, and short *i*. These sounds are introduced in the same way consonant sounds are: the teacher points to the letters and says the sound; then the children imitate the teacher. In this program long vowel sounds are distinguished by macrons (which are removed during the fifth and sixth quarters). Vowel sounds, which are not as distinct from each other as are consonant sounds, are considered more difficult for the children to learn. Therefore, letters representing vowel sounds appear much more often on sounds review pages.

Wisconsin Design. The presentation of the short and the long sounds of vowels are widely separated, the short sounds appearing in the first quarter skills lists, the long sounds in the fifth quarter lists.

d. *Vowel effect from the letters r or l (Table 3d)*. One procedure used at various points in all of the programs, but to a widely varying degree, is to teach the combinations of vowels with *r* or *l*.

When these patterns are taught, many more words become regular and do not have to be treated as exceptional words. Only Lippincott presents these special combinations in the first four quarters. Nine combinations are taught. Distar introduces one in the fourth quarter and two more in the fifth quarter. Ginn teaches eleven in quarters five through eight. Wisconsin presents vowels with r and l in the fifth quarter.

Insert Table 3d about here

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e. Vowel digraphs and dipthongs (Table 3e). Knowledge of commonly occurring vowel digraphs also makes more words regular. All four of the programs present vowel digraphs, but again the difference in when and how many is notable. There are 24 vowel digraphs taught in Lippincott, 29 in Ginn, four in Distar and five in Wisconsin.

Insert Table 3e about here

Some concomitant skills. Each of the programs teaches a host of skills other than those discussed above. Some of these are outlined in the next three tables. As in the previous tables, it is notable that, although almost all of the skills are taught in all of the programs, they are presented at widely divergent points. Table 4a indicates when plurals, prefixes, suffixes and the past tense ed are introduced; Table 4b shows when blending, syllabication, compound words, and contractions are introduced; Table 4c indicates when the concepts of antonyms, synonyms and homonyms are introduced.

Insert Tables 4a, 4b and 4c about here

Irregular words. The term irregular word is typically used to describe words whose phonetic elements do not conform to a group of regular spelling patterns recurring in many English words. All words, however, whose spellings do not conform to the phonetic rules the children have been taught can in a sense be thought of as "irregular" for the children reading them. The four programs vary widely in their treatment of irregular words--from what they call them in the teachers' guides ("special," "basic," "enrichment," "sight," and "irregular") when they introduce them, to what words are considered irregular, to how many are taught in the first year, to how they are taught to the children.

The term sight word is sometimes used to indicate an irregular word. The Wisconsin Design includes, in its sight word lists for each level, portions of the Dolch Basic Word List. Many of these words are irregular in the more general use of the term; since, however, the Design is used with programs including varying phonetic components, it is likely that many of the words on the list would be irregular to many of the children reading them. (It should be noted that sight word does have a more general meaning, which is that any word that can be read as a "whole word" by the reader is indeed a sight word; the goal of any reading program is that the students will be able to read most all the words they encounter by sight).

A few of the major variations among the four programs are apparent in a consideration of the treatment of irregular words in each program. This discussion includes some description of the manner in which irregular words are introduced to the children in each of the programs, as well as when they are introduced and how many are taught. Table 5 is a comparison of special types of words to all words, encountered at the end of the first and second years.

Insert Table 5 about here

Lippincott. The first irregular or "special" word, the, occurs about 1/3 of the way through the first quarter. On the day it is introduced the word is in the title of the story, appears several times in the story and is in a pink box at the bottom of the page. The children are asked to look carefully at the word and are told they will need to memorize it. The first three words taught in the first quarter are the, a, and puts.

Ginn. Since basic words do not contain all of the sound-symbol correspondences the students have previously been taught, each of the basic words can be considered irregular to the children. The first three words taught are Bill, Lad, and runs. The two words, here and said, irregular in the more general sense, are taught in the first quarter.

These words are presented as are the basic words, first on word cards. The students then write the words in their workbooks, and then read the words in different contexts in their books.

Distar. The goal of the irregular word instruction is to teach children to discriminate between the way a word that does not conform to the sound-symbol relationships they are learning is sounded out, and the way it is said. The authors' view is that it is very important for children to learn that irregular words can be sounded out and that there is some similarity between the sounding out and the pronunciation of the word. To accomplish this, the program tasks direct the teacher to have the children sound out an irregular word as if it were regular, after which the teacher says, "That's the way we sound out the word. Here's the way we say the word," and then says the word. The children then say the word. The first three irregular words taught are *said*, *was*, and *to*.

A second strategy created to deal with irregular words is to make many words "regular" by printing the silent letters smaller than the other letters (e.g., *mēat*, *līke*) and informing the children that the small letters are not to be sounded out. These letters are printed full size only after the word has been read many times. Use of this procedure also reduces the number of vowel digraphs that are taught.

Wisconsin Design. There is no method prescribed for the teaching of irregular words, although many of the digraphs and spelling rules that make words more regular are included on the list.

Table 5 is a comparison of irregular words to all words encountered at the end of the first and second years. We see in this table that in _Lippincott_ and _Distar_ a large percentage of the words that children read are regular (above 80%). In _Ginn_, however, many words are presented as basic or enrichment words resulting in a percentage of decodable words of only 13%.

Punctuation Skills (Table 6). Each program teaches a different number of skills and at different quarters of the year. The _Wisconsin Design_ does not include capitalization or punctuation in any of its skill lists; _Lippincott_ introduces capitalization, periods, commas, exclamation points, and question marks all in the first quarter; _Ginn_ presents commas, periods, question marks, quotation marks, exclamation points, and capitalization in the first quarter; and _Distar_ introduces periods, quotations, and question marks in the third quarter but does not explicitly teach commas and contractions (although they are used in the stories the students read) until punctuation and capitalization rules are taught in the language program in the ninth and tenth quarters.

Insert Table 6 about here

Distar is the only program that separates the presentation of upper case letters from lower case letters. Only lower case letters are taught in the first year. Upper case are taught in the second year. In _Ginn_ and _Lippincott_ both lower and upper case letters are taught as sound-symbol correspondences are presented. In _Distar_ no capital letter is taught until the seventh quarter.

Word count at the end of the fourth and eighth quarters (Table 7). This table shows the number of new words presented to the student from the first to fourth quarters, and the fifth to eighth quarters. The total number of new words are in the total column, representing the number of words presented in the Lippincott program. More words are presented in the first year with Lippincott than in two years with Ginn and Distar.

Insert Table 7 about here

Analysis of stories (Table 8). We have selected stories from near the end of the third, sixth, and tenth quarters of the three programs which include stories and have prepared a table containing the following information:

Insert Table 8 about here

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1. Total word count (the number of tokens).
2. Number of different words (the number of types).
3. The proportion of types to tokens.
4. A comparison of decodable words to irregular words for the stories at the end of the third and sixth quarters.
5. The proportion of high frequency words (greater than 50) in the first 50 words of each story.

In determining the future usefulness of the words that the children are reading, we examined the American Heritage Word Frequency Book and decided that a frequency of 50 or more constituted or defined a common word. In the stories we examined the number of word types (words from the same root word) which met this frequency criterion compared to the total number of tokens (words) presented to the student. In determining the frequency of a word, tense, number, possessives, and upper and lower case distinctions were ignored. In the table, the numbers in parentheses in the "total types" rows are the proportion of total types to total tokens.

The type breakdown into irregular and decodable words uses the term irregular for any word which is not decodable (according to what is being taught in a program) to the child reading it. Many of the basic words are not listed as decodable in Ginn because all of their component phonetic elements have not, as yet, been taught.

Different programs allow different numbers of instructional days for the reading of a story, so the length of a story does not reveal what it is expected a student will read in a day's lesson.

This table presents only a few of the variables that could be analyzed, and does not include a sufficiently wide sample of stories from each program to be truly representative. It is intended simply as an indication of the kind of analysis that could be made. A more thorough analysis of more stories could reveal some items of pedagogical interest, for example, how many word types are repeated from story to story, and what is the rate of introduction of new word types?

Such data would reflect the amount of practice the children receive in reading new words that are in the sequence of stories in a program. Other measures could include the ratio of words that have been directly taught in the skills part of lessons to those that appear in stories without having been directly taught, and considering those which have not been directly taught, the ratio of decodable to irregular words.

The high number of irregular words in the early levels of Ginn reflects that program's reliance upon the use of sight words and the gradual teaching of phonetic elements, whereas the large number of regular words at the fourth quarter of Lippincott reflects its approach of rapidly teaching a large number of functional phonetic elements.

The table shows the clear increase in the number of types (different words) that are presented to the students over the third to twelfth quarters as compared to the relatively constant (about .33) proportion of types to tokens (all words). This means that students are expected to learn new words at the same rate (about one out of three words encountered) throughout their first three years of school.

The ratio of high frequency types to total types indicates that all stories examined contain almost exclusively high frequency words. This implies that the words the children read in these stories will appear again in other written material they will encounter.

Conclusion

The instructional and teaching strategies that have been combined into each of these programs are being successfully used by many teachers to teach beginning reading to many children. It should be recalled, however, that many children are not being successfully taught beginning reading skills by teachers using either these or other programs. Because there are such a large number of children in American classrooms who are not adequately taught basic reading skills, there remains a critical need for the analysis and evaluation of the programs being used in those classrooms.

An analysis of programs should not only include an examination of the decoding and other skills that appear in the programs, along with the sequencing of those skills, but should also involve an examination of the relevance to reading of the skills being taught. Are all "essential skills" essential? Given that classroom instructional time is limited, it is important to know which skills within a system are really necessary and which ones are peripheral. It is equally important to evaluate the clarity of instruction manuals to ascertain if they can be followed by the teacher, and if followable, to determine their effectiveness as teaching procedures. There should also be an analysis of student materials, including readers, workbooks and worksheets to determine if they provide an appropriate amount of opportunity for the practice and application of the skills being taught.

The consideration of these four programs gives rise to many more questions, which range from those of program detail to those that relate to classroom implementation. Some of these questions are:

1. Are all of the correspondences, including the consonant clusters and vowel and consonant digraphs, selected to be taught necessary?

2. What effect does the rate of introduction of sound-symbol correspondences have on the child's acquisition of these correspondences? Does the rapid rate used in Lippincott constitute an overload for some children? Is the rate in Distar too slow?
3. Are continuous sounds easier for students to handle, or can they deal with stop sounds as readily?
4. Are the rules that are given for the application of phonetic principles functional? Can the children remember them? When taught, do they pertain to a sufficient number of words?
5. What is the effect of the varying order in the teaching of skills?
6. Does the gradual introduction of phonetic elements in Ginn and Wisconsin make the use of sound-symbol correspondence and other phonetic skills disfunctional? Have the students worked out other reading strategies by the time the last elements are taught?
7. Are the reduced number of correspondences, the modified alphabet and the special prompts used in Distar too "gimicky;" does such a simplification become ineffective when the prompts are removed?
8. Is it more efficient to teach sounds as parts of words, occurring at the beginning, middle and end of the words or to present sounds in isolation and simultaneously teach blending skills? The first approach may entail teaching the children the meanings of beginning, middle, and end and training them to hear sounds in different parts of the word.

9. Is it dangerous to teach sounds in isolation? It is true that in a strict sense many consonant sounds can be pronounced only with a vowel sound that begins or ends the consonant sound. It is also true that each vowel indicates a variety of sounds. Does separating these sounds from the context of the surrounding sounds in a word provide a firm basis for teaching useful sound-symbol relationships?
10. Is the difficulty that some teachers have in hearing and pronouncing sounds in isolation a deterrent to their ability to teach those sounds to their students?
11. Is it better that stories in the first four quarters contain many different words so that the children can get varied practice, applying what they are being taught to different words, or is it better that the children read fewer words but read them more times, so they get more intense practice on a limited set of words?
12. Is there an optimum number of lessons needed for teaching specific skills; how carefully must review and skill integration tasks be programmed into a sequence?
13. What is the effect of careful control of task presentation as contrasted to reliance upon teacher judgement to select appropriate tasks? That is, is it more effective that a teacher teach specific skills in a highly organized framework or to select from a number of instructional suggestions and develop his/her own ways to teach them?

14. How much time should be spent instructing children in basic decoding skills? Is twenty minutes per day for each enough or is an hour and twenty minutes for each child necessary? How much practice do children need?
15. What reading achievement data are available for the kinds of instructional and teaching strategies that these programs represent? How do the data compare to each other? How do the data from these programs compare to other less skill specific programs? For what kinds of children?

The answers to these and other questions may lead us to some decisions that will enable teachers to have access to programs that work, programs that will provide the successful basis for teaching the decoding skills that essentially every child is capable of being taught.

Table 1

Division of Lippincott, Ginn 360, Distar® and Wisconsin into Quarters

LEVEL	YEAR 1				YEAR 2				YEAR 3			
Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Lippincott	Book A	Book B	Book C	Book D	Book E		Book F		Book G		Book H	
Ginn 360	Levels 1 & 2	Level 3	Level 4	Level 5	Level 6	Level 7		Level 8		Level 9		
Distar®	Book A 1 - 56	Book B 57 - 107		Book C 108 - 160	Book A 1 - 40	Book B 41 - 80	Book C 81 - 120	Book D 121 - 160	Level A 1 - 43	Level B 44 - 73	Level C 74 - 110 Level D 111 - 140	Level E 141 - 180
Wisconsin Design	Levels A & B				Level C				Level D			

Table 2

Location of Letter and Sound Correspondences That Are Explicitly Taught in the First Twelve Quarters

LEVEL	YEAR 1				YEAR 2				YEAR 3			
Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Lippincott	ă, n, r, d, ŭ, m, p, ĭ, s, ŏ, t, ĕ, hard g, hard c, h, f	ar,er,ed,w, aw,ow(cow), l,ll,b,le, k,ck,nk, signal e, a(care),ā, ē,ee,ea,ai, ī,ie,ir,ō, ore,or,oa, oe,j,v	sh,ch,tch, th,wh,qu, x,y,z,ng, -ing,-ed, er,as,er, (ir,or,ur) as er -y,-ay, -ey,soft c soft g,dg, dge,-tion -sion,oo (cook) oo (food),ow (snow),ow (cow)ou,ue,ui	oi,oy,ew,eau aw,au,ph as f, hard ch, ch as sh,wr, kn, silent b silent l,silent g, silent h,silent gh,gh as f,ea as ĕ,ea as ā, ear,ie as ē, ei as ē, ei as ā,eigh as ā,ey as ā,augh								
Ginn 360	(initial position)p,b, t,d,hard c, g,h,f,v,s,z, j,m,n,l,r,w, y,optional qu as kw, x as ks	initial k, (final position) p,b,t,d,k,g,m,n, l,ck,r,s,ll,ss, ĭ,ī,signal e, i-e,	(medial position) m,n,final s as z, ĕ, ē,ee, ea as ē, ai as ē,	tr,st,gr,fr,qu,pl,ve as v,x as ks,sh,th,wh,ff,a(can),ay,a-e	sm,bl,nd,nt, st,c as s, ch, sh,tch,ar(barn) aw,u(bus), ī, o-e,ō,oo(cool) oo(look),o(do) o(not)	br,cl,gl,cr,dr, fl,sn,sl,sk,ld, lf,g before e or i, kn, silent b, ow(cow)ow(snow) ou,oa,ai as ā, ā, y(cherry) (ar,er, ir,or,ur) as er, or(fort) ear as er		sp,pr,sw,tw,scr,spr,str,squ, ft,pt,lt,mp,igh,y(cry), ie (tie),ea(bread),ew(blew), ew(few)		ŏ,au,oy(boy),oi(oil),ou (soup),u(united),u-e,ei as ā,u(put),a(watch),ou(country),(ou,au,ei) before gh, ion(billion), ph as f, gh as f, gh (straight)		
Distar	ă,m,s,ē,r, d,f,ĭ,th	t,n,c,o,ā, h,u,g,l,w, sh	I,k,ō,v,p, ch,ĕ,	b,ing,ī,y, er,x,oo,j, ȳ,wh,qu,z,ū	ar,al	ou	ea,ee					
Wisconsin Design	beginning and ending consonant sounds	bl,cl,fl, gl,pl,sl, br,cr,dr, fr,gr,pr, tr, ă,ĕ,ĭ,ŏ,ŭ	sh,ch,th		s(sit),s (trees), hard c,hard g,soft c, soft h, st, sk,sm,sn,sw, sp,ā,ē,ī,ō, ū,(long vowels)vowel+ r,al,aw	ew,oi,oy, ou,ow,oo (choose) oo(book) signal e	ch,ck,sh, ng,th,wh		scr,shr, spl,spr,str, shr,	silent k silent g silent w silent b silent gh silent l		

Table 3a

Single Consonants that Record Invariant and Variant Sounds

LEVEL	YEAR 1				YEAR 2				YEAR 3			
Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Lippincott	n, r, d, m, p, s, t, hard g hard c h, f	l, w, b, k, j, v	q u, x, y, z, soft c soft g									
Ginn 360	b, l, r, j, n, p, y. s, c, d, w, r, h, m, t, v, f, g	k		q u	soft c	soft g						
Distar	m, s, r, d, f	t, n, hard c h, l, w, hard g	k, v, p	b, y, x, j, z, q u								
Wisconsin Design	beginning and ending consonants				hard g hard c soft c soft g s							

Table 3b

Consonant Clusters (Blends) and Consonant Digraphs that Record Invariant and Variant Sounds

LEVEL	YEAR 1				YEAR 2				YEAR 3			
Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Lippincott		ck nk ll	th, sh, ch, tch, wh, ng, dg, dge	gh, ph, ch								
Ginn 360		ll, ss		ff, gr, st, fr, pl, sh, th, tr, wh	bl, nd, nt, sh, sm, ch, st, sch		br, cr, fl, kn, lf, sh, cl, dr, gl, ld, mb, gl, gn		ft, sp, str, pt, squ, pr, spr, sw, sc, lt, scr, tw, mp	ph, gh	Level 10 dge, wr	
Distar	th	sh	ch	wh								
Wisconsin Design		bl, cl, fl, gl, pl, sl, br, cr, dr, fr, gr, pr, tr,	ch, th, sh,		st, sk, sm, sn, sw, sp,		ch, nk, sh, ng, th, wh,		scr, shr, spl, spr, str, thr			

Table 3c

Single Vowels That Record Long and Short Sounds

LEVEL	YEAR 1				YEAR 2				YEAR 3			
Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Lippincott	short ă short ŭ short ĭ short ŏ short ĕ	long ā long ē long ī long ō	y long ū									
Ginn 360		short ĭ long ī	short ĕ long ē	long ā short ă	long ō short ŏ		long ā	y				long ū
Distar	short ă long ē short ĭ	short ŏ long ā short ŭ	long ī long ō short ĕ	long ī y long ū								
Wisconsin Design		short vowels		long vowels								

Table 3d

Vowel Effect from the Letters r, or l

LEVEL	YEAR 1				YEAR 2				YEAR 3			
Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Lippincott		ar, er, are(care) ore, or, le	er- spelled ar,or,ur	ear(learn)								
Ginn 360					ar, al (walk)		ur(fur) er(her) or(color) ar(dollar) ear(search) ir(fir) or(fort)					
Distar				er	ar, al							
Wisconsin Design					vowel + r al							

Table 3e

Vowel Digraphs and Dipthongs

LEVEL	YEAR 1				YEAR 2				YEAR 3			
Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Lippincott		ee,ea,ai, ie,oa,oe	oo(cook) oo(food) ow(snow) ow(cow) ou(soup) ou(four) ou(mouse)	oi,oy, ew(chew) ie(thief) ei(either) ei(vein) eigh(eight) ey(they) eau(beauty) ea(break) ea(bread)								
Ginn 360			ai, ea, ee		oo(moon) oo(foot)		ai,oa, ou(ouch) ow(cow) ow(snow)	ie(pie) ea(bread) ew(few) ew(mew)		au. ou(soup) au(caution) au+gh (daughter) oi(oil) oy(boy)	ue(blue) ei(eight) ei+gh(sleigh) ei(veil) ou(thought)	ou(country) ion(million)
Distar				oo		ou	ea, ee					
Wisconsin Design						oi,ou,oy oo(choose) oo(book)						

Table 4a

Plurals, Prefixes, Suffixes, Past Tense (ed.)

LEVEL	YEAR 1				YEAR 2				YEAR 3			
Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Lippincott		Plurals - - → Suffixes - - →	Past Tense - - →						Prefixes - - →			
Ginn 360		Plurals - - →		Past Tense - - →		Suffixes - - →					Prefixes - - →	
Distar			Plurals - - → Past Tense - - →		Suffixes - - →		Prefixes - - →					
Wisconsin Design		Plurals - - →		Prefixes - - → Suffixes - - →								

Table 4b

Blending, Syllabication, Compound Words, Contractions, Possessives

LEVEL	YEAR 1				YEAR 2				YEAR 3			
Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Lippincott	Blending	→ Syllabication	Compound Words Contractions Possessives	→ → → →								
Ginn 360				Syllabication Contractions Possessives	→ → Compound Words →	→						
Distar	Blending	→		Possessives	→ Contractions Compound Words	→ →			Syllabication	→		
Wisconsin Design			Compound Words Contractions	→ Possessives →	→					Syllabication	→	Possessive →

Table 4c

Synonyms, Antonyms, Homonyms

LEVEL	YEAR 1				YEAR 2				YEAR 3			
Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Lippincott		Homonyms - - →	Synonyms - - → Antonyms - - →									
Ginn 360				Synonyms - - →	Antonyms - - →	Homonyms - - →						
Distar		Antonyms (language program) - - →			Synonyms (language program) - - →							
Wisconsin Design								Homonyms - - → Synonyms - - → Antonyms - - →				

Table 5

Comparison of Special Types of Words to
All Words Encountered at End of First and Second Years
in Ginn, Distar and Lippincott

	End First Year	End Second Year
Ginn		
Basic }Irregular	0.68	0.343
Enrichment }Irregular	0.19	0.423
Decodable	0.13	0.234
Distar		
Decodable	0.82	0.917
Irregular	0.18	0.083
Lippincott		
Decodable	0.85	not available
Irregular "Special"	0.15	

Table 6

Punctuation and Capitalization

LEVEL	YEAR 1				YEAR 2				YEAR 3		
Quarter	1	2	3	4	5	6	7	8	9	10	11
Lippincott	Capitalization Period Comma Exclamation Point Question Mark	Quotation Marks	Apostrophe Hyphen								
Ginn 360	Capitalization Period Comma Exclamation Point Question Mark	Apostrophe									
Distar			Period Quotation Mark Question Mark				Capitalization			Punctuation and Capitalization rules (language program)	
Wisconsin Design	(Does not include capitalization or punctuation in any of its skill lists)										

Table 7

Word Count at the End of the Fourth and Eighth Quarters

	End 4th Quarter	End 8th Quarter	Total
Lippincott	2330	not available	
Ginn	331	(Levels 6 and 7)* 769	1100
Distar	421	1285	1706

* The second year of the Ginn program can consist of Levels 6, 7, and 8 or Levels 6 and 7, depending on the abilities of the students. Therefore, the word count for the second year may be a somewhat low estimate.

Table 8

Analysis of Stories

		LIPPINCOTT	GINN	DISTAR
3rd Quarter	Total Types	137 (.36)	45 (.19)	33 (.40)
	Total Tokens	377	234	82
	Decodable Types	134	2	32
	Irregular Types	3	43	1
	Hi-Frequency Types Total Types (For 1st 50 words)	0.98	0.92	1.00
6th Quarter	Total Types	437 (.26)	113 (.31)	102 (.38)
	Total Tokens	1673	364	270
	Decodable Types		18	86
	Irregular Types (Basic, Enrichment, Special, Silent)		95	16
	Hi-Frequency Types Total Types (For 1st 50 words)	0.94	1.00	0.94
10th Quarter	Total Types	536 (.33)	128 (.36)	155 (.31)
	Total Tokens	1647	357	503
	Hi-Frequency Types Total Types (For 1st 50 words)	0.86	1.00	1.00

Skill Hierarchies in Reading Comprehension

Barak Rosenshine

This paper explores what is known about skill hierarchies in reading comprehension. It begins with an attempt to identify major skills and then looks at possible evidence for the distinctiveness and/or sequencing of these skills, drawing upon three sources: correlational studies, textbooks for elementary teachers, and instructional materials for primary grade children.

To anticipate the major outcomes, no clear evidence was found concerning the distinctiveness of different reading skills. While some evidence pointed to a possible distinction between deriving explicitly and implicitly stated meaning, another interpretation which is discussed is that the dichotomy is actually between reading and reasoning. Reading may involve extracting verbatim information from the passages whereas reasoning may involve combining information across sentences or drawing conclusions or making inferences. Regardless of how reading comprehension is broken down, no evidence or discussion of optimal or preferred sequencing of instruction in reading comprehension was found. Even the major advocate of the distinctiveness of reading comprehension skills, Frederick Davis, wrote that inspection of his data did not indicate a clear-cut order of simple skills leading to more complex skills (Davis, 1972, p. 172). Similarly, the major proponent of learning hierarchies, Robert Gagné, noted that the principles of reading comprehension are quite complex and are typically learned "by a process of discovery from the act of reading" (Gagné, 1970, p. 273).

The issue of whether reading comprehension involves reading or reasoning appeared in a number of reports. Little was written, however, on instruction in reasoning, i.e. deriving implicitly stated meaning, as opposed to instruction in reading.

Lists of Comprehension Skills

The first step was an inspection of lists of reading skills from a wide range of sources to see if there was substantial agreement on a number of common reading skills. If so, one could then explore whether these skills are best learned in a hierarchial fashion. The result, as we shall see, was the finding of a small number of common skills across sources, a larger number of skills unique to different sources, and a large number of subskills which may be prerequisite for the larger skills. In general, there was, at best, mixed evidence for agreement on a group of common skills in reading comprehension.

Table 9 lists both common and unique skills across four fairly authoritative lists. The first, from Science Research Associates, was developed by the Center for the Study of Evaluation at UCLA. The second is the list used by the National Assessment Survey to develop test items. The third is from Scott Foresman's scope and sequence chart for their readers. The fourth was developed by Wayne Otto, the prime developer of the Wisconsin Reading Program at the Wisconsin Research and Development Center. The sample represents both a broad range of sources and some of the best thinking in this area.

Insert Table 1 about here

Several skills are common to all five sources:

locating details

understanding words in context

recognizing the sequence of events

recognizing cause and effect relationships

compare and contrast

recognizing the main idea/title/topic

drawing conclusions/predicting outcomes

One might add fact and opinion, author's purpose, and paraphrasing to the list, although these three are not as pervasive.

None of the above sources acknowledged or discussed a hierarchy of these skills. However, there does appear to be a rough implicit distinction between "detail" and the remaining skills. Locating details seems to be on the simplest level in that it often involves a recognition or matching task; one does not have to search very far in written materials or process very much in order to answer this type of question.

The remaining skills are more difficult to rank. One might tentatively label them as searching and synthesizing skills, since they all involve integrating meaning from connected sentences, or one might differentiate these skills on the basis of length of text searched. For example, the meaning of "words in context" can probably be derived from short segments of a passage, whereas "main idea" and "sequence" require searching and synthesizing larger chunks of material. However, there are many exceptions to a classification based on length of text processed. The difficulty in distinguishing among these "searching" skills is recognized in the taxonomy developed by Barrett (cited in Clymer, 1968). In that taxonomy all of the searching skills were placed on the same level, that of inferential comprehension.

Unique comprehension skills. Beyond the comprehension skills commonly cited by the above five sources, most of them also listed a number of "unique" skills not mentioned by the others (see Table 10). For example, 49 fairly separate skills are listed by Ginn for their primary grade 360 reading series (see Table 11). These lists are not frivolous; each is reasonable and sensible. One can argue that some skills can be combined, but even then the list of unique skills would probably be over 30. One can also argue that some skills should be split. For example, Tom Anderson and his associates at the University of Illinois' Center for the Study of Reading argue that the skill of finding the main idea in science or nonfiction material is fairly simple, whereas finding the main idea in a narrative is a different type of skill. While isolating the main idea may be regarded as a "unique" skill, it is not one which is simply present or absent; rather, the skill is progressively refined over a long period of time. With some

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Insert Tables 2 and 3 about here
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kinds of tests and tasks, very young children can do extremely well, but with others, considerably older children may still experience difficulty.

Comprehension subskills. In addition to the "primary" skills discussed above, other authors have identified certain subskills. For example, in an unpublished paper, Valerie Anderson (of the Ontario Institute for Studies in Education) suggests that learning from context involves recognizing and using the following clues:

contrast clues such as those provided by "but" and "also"
description clues such as "is", "is like", and "was"
synonym or antonym clues
summary clues
clues provided by tone, setting, and mode
clues derived from the main idea and supporting details
prepositional clues
clues derived from cause and effect pattern of sentence meaning.

The list of reading comprehension subskills can be expanded another way. Twenty-four subskills were listed in the University of Illinois and Bolt Beranek and Newman proposal for a Center for the Study of Reading. These included:

word meaning
pure syntax
deeper syntactic-semantic relations
entailment (e.g., if the unicorn is taller tha the boy, then the boy is shorter than the unicorn)

affect meaning

direct speech acts

metaphor

metonymy (e.g., "I drank the whole bottle" means the speaker drank the liquid in the bottle)

knowledge-based anamoly

knowledge-based pragmatic implication.

The relevance, importance, distinctiveness, and pervasiveness of the above postulated subskills remains to be determined. If the subskills are distinct and produce differential effects on outcomes, the results of existing studies of reading comprehension that treat skills globally are confounded; future research will need to control for specific skills.

Summary. Across several sources, there is consensus that reading comprehension entails about seven skills such as recognizing sequence, recognizing words in context, identifying the main idea, decoding detail, drawing inferences, recognizing cause and effect, and comparing and contrasting. Some sources propose a larger number of unique skills and subskills. Regardless of its classification system, no source attempted to organize skills into a hierarchy.

Correlational Studies of Reading Skills

We now turn to correlational studies of reading skills in an attempt to see whether there is empirical support for the distinctiveness of different comprehension skills. The major empirical work on identifying unique or distinct reading skills has been done by Davis (1968, 1972).

Consider Thorndike's description of Davis' research:

> By all odds, the most thoughtfully planned and meticulously gathered set of data is that reported by Davis (1968, 1972), and described in his Psychometric Research on Comprehension in Reading. Following up on his early (1941) rational and statistical analysis of reading skills, Davis selected from a very large item pool, test items to measure eight hypothesized reading skills. The experimental independence of the items was assured by basing each item on a separate bit of reading. Preliminary item analysis was carried out to identify and retain subsets of items that were homogeneous and distinct in the sense that each item correlated more highly with total scores of the group of items designed to represent its own skill than it did with total score for any of the seven other skills. Thus, both editorial and statistical efforts were concentrated on differentiating the several skills. Estimates of the reliability of each of the subtests were obtained with great care. (Thorndike, 1973, pp. 178-179).

Two forms were used in the study, each form containing 12 items measuring each of the eight skills. (The eight skills are presented and illustrated in Table 4, taken from Davis' 1968 article).

Insert Table 4 about here

The original treatment of these data (Davis, 1968), employing "uniqueness analysis," identified five unique skills, as illustrated in Table 5. These were:

recalling word meanings

finding answers to questions asked explicitly or in paraphrase

drawing inferences from content

recognizing a writer's purpose, attitude, tone, or mood

following the structure of a passage.

The factor analysis (Davis, 1972) yielded four clear factors which were consistent across the two forms (see Table 13). These were:

word meaning

determining meaning from context

finding answers to questions answered explicitly or in paraphrase in the passage and weaving together ideas in the content

skill in drawing inference from the content.

Thus, three skills emerged as distinct across the two analyses: word meaning, explicit answers, and inferences.

Insert Table 5 about here

Despite the discovery of separate factors or unique skills, Davis does not believe that his research has produced evidence in favor of a hierarchical skills theory. First, he notes that his previous work shows that "tests measuring a wide variety of skills involved in comprehension are positively, and in most instances, closely correlated "

(1972, p. 172). Further, he states that:

> The hierarchical skills theory cannot be reconciled with experimental findings concerning the intercorrelations of skill tests in reading comprehension.... Inspection of the intercorrelations in Davis' cross-day matrices (Davis, 1968, p. 524), based on scores of 988 twelfth-grade students in academic high schools shows no marked evidence that the eight skill tests (which display approximately equal reliability coefficients) can be arranged in a clear-cut order of cumulative agglomeration of simple skills in more complex skills. More systematic investigation of this point needs to be made. (Davis, 1972, p. 172)

In sum, a major review and research study in reading comprehension revealed some unique reading skills, but no evidence that these skills are hierarchical.

In his suggestions for future research Davis reaffirms this lack of knowledge of reading hierarchies. He suggests controlled experiments, using specially prepared workbooks for teaching purposes, to determine the effect on comprehension of teaching the skills identified in his research. He further discusses the need "to determine the effect on overall comprehension of different 'orders' (or hierarchies) in which operational skills...are taught and practiced" (Davis, 1972, p. 675). Surprisingly, these experiments have not been done, and the need for such work continues to exist.

Additional analyses of Davis' data. The search for unique skills in reading comprehension was continued by Thorndike (1973) and by Spearritt (1972) in reanalyses of Davis' data.

Thorndike used "reliability coefficients rather than unities as the diagonal entires" (1973, p. 139). Three factors emerged, with the first factor accounting for 93 percent of the variance. Thorndike also factor analyzed four other sets of data and found, in each case, that 80-90 percent of the meaningful variance appeared in the first factor and the remainder was exhausted by two or possibly three factors. Thus, he concluded that the reading skills selected by Davis were not distinguishable. Thorndike also claimed that even the distinction which Davis made between "word knowledge" and "reasoning in reading" (or inferring from the text) was not justified, because there was little differentiation between word knowledge and paragraph comprehension in the factor analysis.

Furthermore, Thorndike claimed that a measure of reading ability can be an international "culture-free" measure. In a cross-national study of thirteen-year-old children in eleven countries, the items having been translated into eight languages. There were no correlations below .80, suggesting that this general reading skill is the same whether in English, French, Swedish, or Serbo-Croatian.

Spearritt applied maximum likelihood factor analytic procedures (Joreskog et al., 1968, 1971) to the same Davis data. The first analysis led to the conclusion that Davis' original eight hypothesized skills could not be experimentally identified as separate skills.

Subsequent analyses yielded four separate reading skills:

recalling word meanings

drawing inferences from the content

recognizing a writer's purpose, attitude, mood, and tone

following the structure of a passage.

These four had been previously identified by Davis as distinct. A fifth skill, finding answers to questions answered explicitly or in paraphrase, did not emerge as a separate skill.

Of all the skills, vocabulary was best differentiated, as it was in the Davis and in the Thorndike analyses. Spearritt further concluded that "when the correlations between vocabulary and the other factors are excluded from consideration, the remaining correlations are extraordinarily high." Thus, although certain comprehension skills can be differentiated, present types of reading comprehension tests, as distinct from word knowledge tests, largely measure one basic ability, which may well correspond to the label of "reasoning in reading" (Spearritt, 1972, p. 110).

Robert Gagné, one of the originators of the idea of learning hierarchies, has shied away from discussing learning hierarchies in reading comprehension even though he suggested the existence of learning hierarchies in decoding. When discussing principles of reading comprehension, he noted that "all such principles are quite complex and are typically learned not as formally stated rules but by a process of discovery from the act of reading" (Gagné, 1970, p. 273).

Additional factor analytic studies. The results of additional factor analytic studies, as summarized by Berg (1973) are shown in Table 6. In these studies, there is little evidence for separate factors. In the most relevant study, by Schreiner, Hieronymus, and Forsyth (1969), even the major subskills in reading comprehension (e.g., cause and effect, main idea, and inferences) did not load on separate factors.

Insert Table 6 about here

This review led Berg to the following conclusions:

> There are many more studies in the literature that add up to the same generalization: there are few consistent findings relative to a large number of statistically identifiable separate reading abilities. A rough average of the number of factors that researchers suggest (lies) somewhere between two and five. Lemmon (1962) suggested that only four factors can be measured reliably: 1) a general verbal factor, 2) comprehension of explicitly stated material. 3) comprehension of implicit or latent meaning, and 4) appreciation... Yet, as already stated, a review of reading tests turns up 70 to 80 factors that various tests implicitly claim to measure.

In another review, MacGintie (1973) reached a similar conclusion. He claimed that the most promising distinction is between understanding facts explicitly stated in a passage and making inferences from what is stated. "Even this distinction is not an easy one, and we should require a clear demonstration that two subtests are measuring this distinction before we pay much attention to comprehension subtest scores that claim to represent different aspects of comprehension."

Reading comprehension and reasoning. Carver (1973) has developed an interesting indictment of reading tests. Following Spache (1965), he described four levels of comprehension:

1. Decoding of words and determination of their meaning in a particular sentence.
2. Combining meanings of individual words into complete understanding of the sentence.
3. Understanding of the paragraph and its implied main idea, as well as cause and effect, hypothesis-proof, implications, unstated conclusions, and ideas associated with,but tangetial to,the main idea of a paragraph.
4. Evaluation of ideas, including questions of logic, proof, authenticity, and value judgements.

Carver believes that levels 1 and 2 represent reading, whereas levels 3 and 4 represent reasoning. He also believes that most reading tests are heavily weighted with levels 3 and 4, thus accounting for the conclusion that reading is reasoning.

Almost all of the reading comprehension skills discussed above and to be discussed in the next section would thus be coded as "reasoning" by Carver, just as Barrett (in Clymer, 1968) coded the same skills as "inferential comprehension." Thus, most of the skills listed under reading comprehension might be also labeled as reasoning, and talk of a hierarchy or optimal sequence of reasoning skills at this time takes us well beyond available research. The topic simply has not been studied.

In the 1968 NSSE yearbook on reading instruction, two authors noted the lack of research on learning sequences. Wittick (1968) claimed that little research has been done to determine the most effective learning sequences, and that "sequences have been produced logically rather than psychologically" (Wittich, 1968, p. 75). Robinson (1968) also called for more research and stated that "within the next ten years, a large amount of additional information of effective sequences should be available." (Robinson, 1968, p. 406). In reading comprehension, at least, such research has not appeared.

Substrata-factor studies. Studies by Holmes (1948), Singer (1965) and Singer (1966) were attempts to identify the "sub-strata factors," speed of reading and reading comprehension. However, these studies are not relevant to this review, because reading comprehension itself was a criterion measure, and the predictor variable did not include comprehension skills or subskills. Rather, the predictor variable included:

word discrimination
span of recognition
number of fixations per 100 words

knowledge of word meanings

accuracy of word perception

speed of word perception

visual verbal meaning

reasoning facility

interest in literary rather than computational activities

general information.

Thus, however valuable their specific multiple-regression procedures may be, because of the variables selected, the results themselves are not particularly relevant to this review.

Summary. Several analyses of the best data available on reading comprehension skills (Davis, 1958, 1972) have revealed at most four distinct skills (aside from word meaning). However, Thorndike and Spearritt noted that even these four skills are highly intercorrelated. Whatever the total number of distinct skills, however, they do not appear to be hierarchically structured, nor have there been studies of optional sequences for teaching or learning these skills. Even in the most limited case--the distinction between locating explicitly stated details and implicitly stated answers--the results are not clear-cut.

There are a number of possible explanations for this lack of distinct factors. Davis' work was limited to twelfth grade students, and the reanalyses by Thorndike and by Spearritt were based on Davis' data. No other studies were found in which the investigators limited themselves to specific comprehension skills as Davis did. It is possible that other investigations at lower grade levels might yield more distinct results.

It is also clear that factor analysis is not an appropriate technique for identifying hierarchies. Whether more sensitive techniques exist which could detect hierarchies is an open question. One suspects that experimental approaches might be more fruitful than these a posteriori procedures. Nonetheless, if factor analytic techniques have failed to identify distinct and independent reading comprehension skills, it seems unlikely that other a posteriori techniques would locate both distinct skills and a hierarchical ordering.

The more persuasive explanation is Carver's suggestion that understanding of implied main idea, cause and effect, unstated conclusions, and questions of logic and proof represent reasoning, whereas reading is limited to decoding, determining word meaning, and determining sentence meaning. The study of reasoning, then, might involve quite different approaches from those used in the study of reading.

Another possibility is that the way in which a question is asked can affect the type of processing required and change an apparently explicit item into an implicit one. Consider the following passage:

> Mary read three books last summer. Johnny said, I wish I could do as well."

The question, "how many books did Mary read?" is a detail question. However, even this level can become more complex through the use of synomons (How many books did Mary finish? and still more complex through paraphrase (Who read more books, Mary or John?). This third question, although ostensibly still a detail question, involves more transformations than the first. Thus, nominal labels for skills may not always be representative of actual processes.

Textbooks for Elementary Reading Teachers

Four major textbooks for elementary reading teachers (Durkin, 1974; Karlin, 1975; Otto, McMenemy, & Smith, 1973; Tinker & McCullough, 1975) were inspected to determine whether they utilized sequencing or hierarchical ordering of reading comprehension skills. No explicit mention of hierarchy or sequence was found.

There was, however, a division of comprehension into literal, interpretative (or inferential), and critical reading. Literal refers to word meaning, context clues, sentence meaning, and paragraph organization--the ability to derive explicit meaning from text. Under interpretative or inferential reading, the authors include: reaching conclusions, drawing inferences from what is read, identifying purpose, anticipating outcomes, making generalizations, and recognizing the main idea. Critical reading refers to recognizing the difference between fact and opinion, recognizing the logic of arguments, and judging the appropriateness of arguments and conclusions.

Thus, the distinction between literal and interpretative reading appears to support the same rough hierarchy of explicit and implicit meaning that was discussed in the above section on correlational studies. The borders between these two concepts are, of course, fuzzy. Skills such as grasping the meaning of methphors and similies, or identifying sequence, or understanding cause and effect might be classified as literal or as interpretative by different authors. But the general distinction between explicit and implicit meaning is acknowledged by most authors. (Recall, however, that in Spearritt's reanalysis of the Davis data for twelfth grade students, "understanding explicit meaning" did not emerge as a distinct skill).

Analyses of Primary Grade Reading Materials

The publishers' scope and sequence charts for the first three semesters of five primary grade reading curricula were inspected to determine whether the publishers indicated they presented comprehension skills in either a sequential or hierarchical manner. Those five curricula were:

1) Ginn and Company: Reading 360
2) Harper and Row: Design for Reading
3) J.B. Lippincott Company: Basic Reading 1975
4) Scott Foresman Systems: Reading Unlimited
5) Webster/McGraw-Hill: Programmed Reading

The time of introduction and subsequent appearance of eight reading comprehension skills were noted and graphed (see Tables 7, 8, and 9). The skills of interest were:

1) locating details
2) recognizing the main idea
3) recognizing the sequence of events
4) drawing conclusions
5) recognizing cause and effect relationships
6) understanding words in context
7) making interpretations (judgments and generalizations)
8) making inferences from the text.

Insert Tables 7, 8, and 9 about here

Analyses across programs. Across the five programs, one notes that all eight comprehension skills were introduced early--within the first two semesters of the first year. The exceptions to this statement are the Webster/McGraw-Hill Programed Readers (MH), which do not introduce any comprehension skills until their sixth book (reading level 2.3), and Harper and Row (HR), which delays introduction of one skill--understanding words in context--until the second year.

Across the four programs (McGraw-Hill is excepted) there is no particular order for introducing practice in these skills. Recognizing sequence, recognizing cause and effect, and making inferences are all introduced in the first semester. The programs also introduce locating details and drawing conclusions in the first semester (with the exception of Scott-Foresman, which delays these two skills until the middle of the second semester). Similarly, locating words in context is usually introduced in the first semester (with the exception of Harper and Row, which delays this until the middle of the third semester).

There are only two comprehension skills not generally introduced in the first semester. The skill of recognizing the main idea is usually delayed until the second semester,and that of making interpretations appear early in two programs (Harper and Row and Scott Foresman) but do not appear in the first three semesters in the other two programs (Ginn and Lippincott). Thus, with the exception of McGraw-Hill, or isolated instances noted above, the programs introduce most of the skills in the first semester and the remainder in the second semester.

Analyses within programs. Within programs there is also little evidence of a sequence for presenting skills. Lippincott, Ginn and Harper and Row introduce almost all of their skills early in the first semester. They do, however, show one slight common pattern: they delay introducing locating the main idea, Harper and Row until the middle of the first semester and Ginn and Lippincott until the second semester. Scott Foresman uses a two-step process, introducing half the skills in the first semester and the other skills (detail, main idea, and drawing conclusions) in the second semester.

Only McGraw-Hill has any evidence of a sequence. As shown in Table 8, they delay introducing any skills until the 2.3 reading level, and usually introduce skills one at a time across three years of reading levels. Contrary to expectations, McGraw-Hill introduces the inferential skills of drawing conclusions and recognizing cause and effect prior to the more literal skill of locating details.

Overall, with the exception of a delay in introducing main idea until the second semester, no particular sequence for the introduction of reading comprehension skills was found either across or within programs. Also Tables 7 and 8 show no evidence of the usual idea of hierarchy. In the common examples of hierarchies, such as Gagne's, once a skill is mastered it is no longer taught. For example, if simple addition is a prerequisite for learning division, once this addition skill is learned it is no longer taught. But in reading comprehension, once a skill is introduced it continues to be studied throughout the first three semesters and, indeed, throughout the first six grades. Thus, locating details or recognizing sequence is never considered as mastered, but rather these skills are continually studied at increasing levels of difficulty.

The Need for Experimental Studies on Comprehension Skills

Given the high intercorrelations which exist between different learning from text skills, it seems that further correlational research will not yield anything new. Thus, it seems more reasonable to turn to exploratory experimental studies. The first major question is simple: does learning a particular skill increase reading comprehension scores for that skill more than learning some other skill does? For example, if one student spends a good deal of his time doing exercises on "main idea" or "synthesis" and another does exercises on "sequence", will the two students differ on tests of synthesis and sequence? To the best of our knowledge, such studies have not been done.

The correlational research suggests that spending time on any one skill will be as effective as any other. That is, time spent doing synthesis exercises will be as effective for gain in sequence as it will be for synthesis. On the other hand, there is a broad literature on content covered or opportunity to learn which suggests that one primarily learns what one is taught.

A possible study is illustrated in Figure 1. In this study, students would do progressive exercises in only one skill and would be tested on all four skills. Training in reading carefully and following directions would take place for all prior to instruction to insure high attention. The number in the diagonal represents the top of a 5 point scale, the scores we assume students would achieve in their own area. In addition, another factor could be introduced to see whether time spent in reading itself is as effective as time spent on reading exercises. We hope to conduct such a study soon.

Insert Figure 1 about here

Table 1

Categories in Common Across Sources

SRA (literal and inferential comprehension)	National Assessment (ages 9-13)	Scott-Foresman	Otto
1. main idea/title	main idea/title	main idea	topic/main idea
2. detail	(a) recognizing facts (b) retaining facts	detail	detail
3. sequence	organization	sequence	sequence
4. draw conclusions	(a) draw inference from material given	predict outcomes and conclusion	predict outcomes
5. cause and effect	(b) draw inference from material given plus previous knowledge	cause and effect	cause and effect
6. compare and contrast		----	----
7. fact and opinion	fact and opinion	----	----
8. author's purpose	author's purpose	----	----
9. ----	words in context	----	words in context

Table 2

Unique Categories from Each Source

SRA	National Assessment	Scott-Foresman	Harris & Smith	
classifying sets of words paraphrase and summarize character's emotion and trait logical thinking	recognizing and evaluating sources literary devices mood and tone	characterization classification and seriation empathy evaluation following directions foreshadowing generalization judgment literary style mental imagery previewing recall relationships analogous part-whole place-space size time skimming summarizing	none	synthesizing information reason from a premise interpret negative sentences interpret sentences with right branching interpret sentences in passive voice syllogistic reasoning inductive reasoning meaning of prefixes

Table 3

Comprehension Skills in the Ginn 360 Series

The student will...

IDENTIFY elements of content by

- matching activity to directions
- classifying information as fact or opinion
- matching characters with their traits, actions, speech
- categorizing events in story plots, facts in selections
- matching illustrations to text
- locating words, sentences, or parts of the story that answer questions, match descriptions, or support points
- matching details with their selections
- classifying statements about the selection as accurate or not
- locating untrue statements about a selection
- classifying questions about a selection according to whether they have been answered or not
- classifying selections or parts of selections according to point of view revealed
- matching cause and effect
- matching paragraph, page, selection, and main idea or title
- matching main idea with details
- categorizing details as relevant or not
- matching statements with inferences
- categorizing story elements into problem, climax, and solution

Table 3 (continued)

NAME elements of content by

- listing characters
- listing characters to match given dialogue or actions
- indicating objects or characters to fit descriptions or answer riddles
- giving setting or time
- listing story events, retelling stories read, identifying sounds heard
- listing particular facts or details
- stating the main idea or theme
- stating the moral
- stating problem, climax, solution
- stating point of view from which story is told
- indicating the selection that contains specified details

DESCRIBE elements of content by

- recounting character traits, qualities
- defining the moral
- giving an account of picture details
- providing literal interpretation of text
- giving an account of personal experience or knowledge related to the selection
- giving an account of visualization of the text
- predicting what his or her reactions would be to the story situation
- giving an account of similarities or differences in the content or plot of selections
- explaining the suitability of titles or headings

Table 3 (continued)

CONSTRUCT elements of content by

- creating illustrations to fit the text
- making inferences about events before or after an episode or story, including anticipating story content
- making inferences about actions or feelings
- making inferences about reasons for actions or speech
- dramatization, role-playing, puppetry, storytelling based on the selection
- making inferences about what would happen if circumstances were different
- making inferences about content of selections from titles or headings
- evaluating ideas in a selection
- evaluating characters' actions

ORDER elements of content by

- placing events in the order of occurrence
- matching events to time

Table 4

Sample Items Measuring Eight Skills of Comprehension in Reading

1. Remembering word meanings

   1. guffaw

      A. make fun of
      B. sneeze
      C. cough
      D. laugh

2. Inferring word meanings from context

   I felt purified and had a strange apprehension of a secret innocence and spirituality in nature--a foreknowledge of some bourn, incalculably distant perhaps, to which we are all moving.

   2. "Apprehension" (line 8) most nearly means

      A. fear
      B. perception
      C. recollection
      D. seizure

3. Understanding content stated explicitly

   All program changes must be recorded on blanks furnished by the Registrar and filed with him after they have been approved by the student's advisor.

   3. Program changes are to be filed with the

      A. Registrar
      B. Student's adviser
      C. Director of the School of Education
      D. Dean of the College of Liberal Arts

4. Weaving ideas in the content

   One early April I visited a man who had an outdoor swimming pool. The first night my host asked, "Are you a morning plunger?"

   Thinking he referred to a tub plunge in a warm bathroom, I glowed and said, "You bet!"

   "I'll call for you at seven, then, and we'll go out to the pool."

   It was evidently his morning custom, and I wasn't going to have it said that a middle-aged man could outdo me. My visit lasted five days, and I later learned from one to whom my host confided that they were the worst five days he had ever gone through. "But I couldn't be outdone by a mere stripling," he said, "and the boy surely enjoyed it."

Table 4 (continued)

---

4. The writer and his host both

   A. liked to swim
   B. disliked swimming
   C. were amused by the other's behavior
   D. misunderstood the other's real feelings

5. Making inferences about the content

The delight Tad had felt during his long hours in the glen faded as he drew near the cabin. The sun was nearly gone and Tad's father was at the woodpile. He was wearing the broadcloth suit that he wore to church and to town sometimes. Tad saw his father's hands close around a bundle of wood. He was doing Tad's work--and in his good clothes. Tad ran to him. "I'll git it, Pa."

5. When Tad saw his father, he felt

   A. disappointed
   B. impatient
   C. angry
   D. guilty

6. Recognizing the author's tone, mood, and purpose

The golf links lie so near the mill
   That almost every day
The laboring children can look out
   And see the men at play.

6. This verse was written about 1915 and refers to a social problem of the period--child labor. The tone of the verse is

   A. resigned
   B. beligerent
   C. bitterly ironic
   D. mournful

7. Identifying the author's literary techniques

Thomas Girard once remarked of George V: "King George does not reign; he merely sprinkles."

7. Girard was making use of

   A. exaggeration
   B. understatement
   C. a play on the word "reign"
   D. a play on the work "sprinkles"

Table 4 (continued)

---

8. Following the structure of the content

Only the adult male cricket chirps. On a summer night, they sing by the thousand in unison, so that the forest seems to pulsate and the tiny unseen orchestra becomes its very voice.

8. "Its" (last line) refers to

A. "adult male cricket"
B. "summer night"
C. "forest"
D. "tiny unseen orchestra"

Note:--(from Davis, 1968)

Table 5

Summary of Davis and Thorndike Analyses of Davis' 1968 Reading Data[1]

Test	Davis-Uniqueness Analysis		Davis-Principle Components Analysis		Thorndike-Factor Analysis					
	Percentage of unique variance in non-error variance		Skills identifying distinguishable factors in Davis' component analysis		Rotated factor loadings[2] (R. L. Thorndike)					
	Cross-Validation by Test Forms and Days (within days)	Cross-Validation by Test Forms (across days)	Matrix 1	Matrix 2	Factor I M1	Factor I M2	Factor II M1	Factor II M2	Factor III M1	Factor III M2
1. Recalling word meanings	35	29	X	X	76	74	--	--	--	--
2. Drawing inferences about the meaning of a word from context	-1	8	X	X	74	72	22	28	21	--
3. Finding answers to questions answered explicitly or in paraphrase	13	7	X	X	70	60	21	51	24	--
4. Weaving together ideas in the content	5	5	X	X	79	63	--	49	22	--
5. Drawing inferences from the content	23	18	X	X	65	48	--	54	44	25
6. Recognizing a writer's purpose, attitude, tone and mood	14	8	--	X	75	62	21	39	--	35
7. Identifying a writer's techniques	8	3	X	--	71	70	38	44	--	--
8. Following the structure of a passage	15	12	X	--	66	64	46	55	--	--
Skills considered to be experimentally distinguishable	Nos. 1, 3, 5, 6, 8		Nos. 1, 2, (3, 4), 5		No. 1					

[1] Taken from Spearritt, 1972.

[2] Decimal points omitted.

Table 6

Results of Additional Factor Analytic Studies as Summarized by Berg (1973)

Thurstone, 1956 (reanalysis of Davis, 1944)	
single general factor	
Hall and Robinson, 1945	
attitude of comprehension accuracy	
rate of inductive reading	
word meaning	
rate of reading unrelated facts	
chart reading skill	
Stolurow and Newman, 1959	
semantic difficulty (words)	
syntactic difficulty (sentences)	
Hunt, 1957	
word knowledge	
paragraph comprehension	
Schreiner, Hieronymus, and Forsyth, 1969	Not separate factors:
speed of reading	paragraph meaning
listening comprehension	determining cause and effect
verbal reasoning (classification of words)	reading for inferences
speed of noting details	selecting the main idea

Table 7

Scope and Sequence of Reading Comprehension Skills

Ginn 360

Skill	Grade 1:1			Grade 1:2			Grade 2:1		
	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late
Detail	├──	──	──	──	──	──	──	──	──→
Main idea				├──	──	──	──	──	──→
Sequence	├──	──	──	──	──	──	──	──	──→
Draw conclusion	├──	──	──	──	──	──	──	──	──→
Cause and effect		├──	──	──	──	──	──	──	──→
Words in context	├──	──	──	──	──	──	──	──	──→
Interpretation	scattered from 1:2 on, but not many exercises								
Inference									

Table 7 (continued)

Harper and Row									
Skill	Grade 1:1			Grade 1:2			Grade 2:1		
	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late
Detail	├──	───	───	───	───	───	───	───	──→
Main idea		├──	───	───	───	───	───	───	──→
Sequence	├──	───	───	───	───	───	───	───	──→
Draw conclusion	├──	───	───	───	───	───	───	───	──→
Cause and effect	├──	───	───	───	───	───	───	───	──→
Words in context								├──	──→
Interpretation (making judgments)	├──	───	───	───	───	───	───	───	──→
Inference	├──	───	───	───	───	───	───	───	──→

Table 7 (continued)

Lippincott Series

Skill	Grade 1:1			Grade 1:2			Grade 2:1		
	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late
Detail	├───	────	────	────	────	────	────	────	───→
Main idea				├───	────	────	────	────	───→
Sequence		├───	────	────	────	────	────	────	───→
Draw conclusion		├───	────	────	────	────	────	────	───→
Cause and effect	not indicated								
Words in context		├───	────	────	────	────	────	────	───→
Interpretation	not indicated								
Inference			├───	────	────	────	────	────	───→

Table 7 (continued)

Scott Foresman Series

Skill	Grade 1:1			Grade 1:2			Grade 2:1		
	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late
Detail					├──	────	────	────	──→
Main idea					├──	────	────	────	──→
Sequence	├──	────	────	────	────	────	────	────	──→
Draw conclusion			introduced ├──┤		├──	────	────	────	──→
Cause and effect			├──	────	────	────	────	────	──→
Words in context	├──	────	────	────	────	────	────	────	──→
Interpretation (generalizations and judgments)	├──	────	────	────	────	────	────	────	──→
Inferences		├──	────	────	────	────	────	────	──→

Table 8

Scope and Sequence of Reading Comprehension Skills

in McGraw-Hill Programmed Reading Series

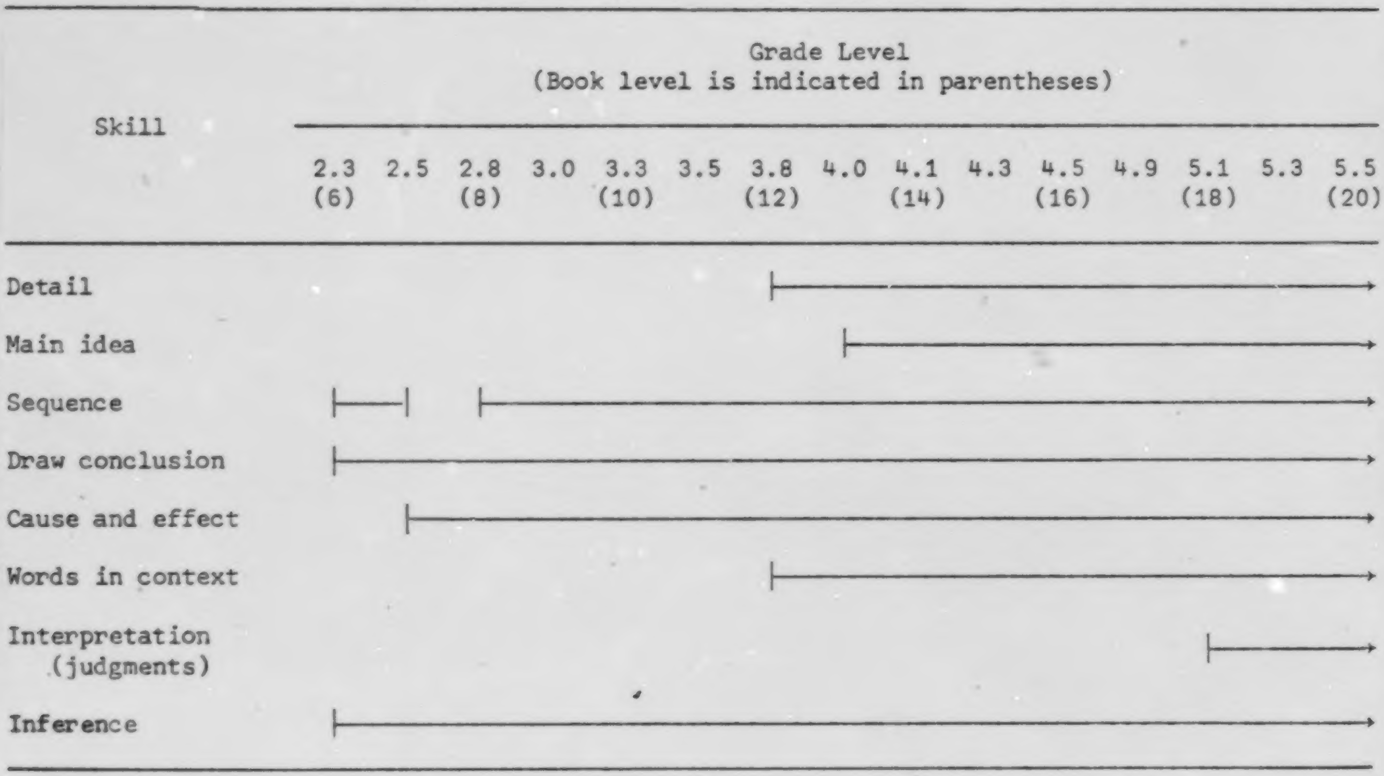

Table 9

Time of Presentation of Comprehension Skills

Detail

Ginn 360	1:1 Early
Harper-Row	1:1 Early
Lippincott	1:1 Early
Scott Foresman	1:2 Middle
McGraw-Hill	3.8 (Book 12)

Main Idea

Ginn 360	1:2 Early
Harper-Row	1:1 Middle
Lippincott	1:2 Early
Scott Foresman	1:2 Middle
McGraw-Hill	4.0 (Book 13)

Sequence

Ginn 360	1:1 Early
Harper-Row	1:1 Early
Lippincott	1:1 Middle
Scott Foresman	1:1 Early
McGraw-Hill	2.8 (Book 8) (introduced 2.3, Book 6)

Draw Conclusion

Ginn 360	1:1 Early
Harper-Row	1:1 Early
Lippincott	1:1 Middle
Scott Foresman	1:2 Middle (introduced 1:1 late)
McGraw-Hill	2.3 (Book 6)

Cause and Effect

Ginn 360	1:1 Middle
Harper-Row	1:1 Early
Lippincott	(not indicated)
Scott Foresman	1:1 Late
McGraw-Hill	2.5 (Book 7)

Words in Context

Ginn 360	1:1 Early
Harper-Row	2:1 Middle
Lippincott	1:1 Middle
Scott Foresman	1:1 Early
McGraw-Hill	3.8 (Book 12)

Interpretation (judgment or (generalization)

Ginn 360	scattered from 1:2 on
Harper-Row	1:1 Early
Lippincott	(not indicated)
Scott Foresman	1:1 Early
McGraw-Hill	5.1 (Book 18)

Inference

Ginn 360	1:1 Early
Harper-Row	1:1 Early
Lippincott	1:1 Late
Scott Foresman	1:1 Middle
McGraw-Hill	2.3 (Book 6)

Figure Caption

Figure 1. Design for a study on comprehension skills.

READING CAREFULLY	FOLLOWING DIRECTIONS

	SYNTHESIS	PARAPHRASE	CONTEXT	LOCATING THE ANSWER
SYNTHESIS	5			
PARAPHRASE		5		
CONTEXT			5	
LOCATING THE ANSWER				5
REGULAR READER				
HIGH INTEREST READERS				

Conclusion

To summarize the main findings of this review, we provide here our best answers to what we regard as the most important questions pertaining to skills hierarchies.

1. What have been the main approaches to reading instruction?

An historical overview of reading instruction in the last 50 years suggested that there are three major approaches to the teaching of beginning reading. A sight approach was first advocated in which words were assumed to be learned by repetition. This learning procedure was underscored by providing children with texts in which frequently occurring printed words were emphasized and a low limit was placed on new words in stories. This was replaced by a sight-phonics approach in which sight-word text materials remained essentially unchanged but were supplemented by a parallel phonics program. Most recently, text materials were completely reoriented to favor particular letter-sound correspondence patterns. Influenced by linguists, not only was the stress to use common words replaced by the use of words obeying the most regular letter patterns but also the method of learning new words shifted from a reliance on repetition to a preference for blending and letter-sound generalization. Because of the loosely defined character of the first two approaches, it was asserted that only the most recent approach could be described in terms of a skills hierarchy.

2. How has research in linguistics and cognitive psychology influenced reading instruction?

Historical changes in reading instruction have, for the most part, followed research findings in linguistics and psychology. Linguists have shown that print does contain a regular structure but that the most common words of English are the least likely to have regular letter-sound patterns. Developmental linguists have demonstrated how poorly beginning readers identify or segment phonemes in words or even words in phrases. This work has been extended, showing that later reading success is closely tied to an ability to segment phonemes and to pronounce unknown words. Current research indicates that morphophonemic principles are complex, especially with regard to the relationship between spoken and written English. The research implies that the typical method of instructing children to pronounce multisyllable words is much too simplistic. Speech acquisition research is providing some suggestions about how children acquire decoding skills and, also, what reading instructions are initially appropriate.

Early work in perception studies showed that printed words are not recognized simply in terms of their length or letter complexity. The familiarity of the word plays a major role in the recognition of that word by the young reader. This phenomenon has sparked research to explain the effect. An instructional ramification of this effect is that reading practice itself will facilitate word recognition skill and speed. Instructional extensions of word recognition work with children has indicated that abilities to generalize letter-sound patterns and to use contextual cues also foster word recognition.

Current work by cognitive psychologists has demonstrated the importance of inference in comprehension. This includes a need for the reader to be knowledgeable about a topic before reading (to possess a framework) and to monitor whether he is understanding what is being read. It is apparent that children sometimes lack the realization that comprehension is concurrent to the physical act of reading. With regard to the issue of a skills hierarchy, the research has not uncovered any semblance of an ordering. Instead, children comprehend less than adults because of processing deficits and unfamiliarity with the topic or materials, not because there is an instructional order or there are inherent capacity differences.

3. Are there discrete decoding and comprehension skills?

Considering the comprehension area first, it is difficult to confidently put forth any set of discrete comprehension skills. Different factor-analytic procedures, applied to identical data which began with eight nominally different skills, have yielded one, two, or four independent factors. To dramatize the situation, it is not even clear that the skill of deriving explicit meaning from texts is separate from skills of deriving implicit meaning. At this point, there is simply no clear evidence to support the naming of discrete skills in reading comprehension.

Shifting our attention to decoding aspects, we are not aware of any comparable research addressed to questions regarding the separability of various decoding skills. Rather, it appears that the fact that the skills are discrete has been generally assumed. Reading programs act under that assumption in the teaching of phonics, for example, by teaching consonants separately from vowels, single letter sounds earlier than letter cluster sounds, and one syllable words before most multisyllable words.

4. Do the skills appear, or are they taught, in a hierarchical order that is consistent from program to program?

Comprehension skills are simply not taught in a hierarchical fashion. In a typical hierarchy, once a skill has been taught, it is not retaught. Thus, in decoding training students are not explicitly taught long vowel sounds from first through fifth grades. But reading comprehension skills _are_ continuously taught from the first through the fifth grade. In addition, there is no hierarchy in the order in which comprehension skills are introduced. In each program studied, almost all skills are introduced in the first year of school. It appears that _all_ the major comprehension skills can be introduced, in a simplified form, in the first year of school.

When decoding components of the programs are considered, the picture is somewhat different. Within each program, the skills and subskills are arranged in a generally hierarchical scheme according to rules generated by each program author. However, there is then considerable variation among programs in both the number of skills taught and the times at which they are introduced. This point can be illustrated by looking at specific points of common and unique practice. There are some sound-symbol correspondences which are taught by all programs in approximately the same number: single consonants that record variant and invariant sounds, and single vowels. Even here, however, the time at which each of these correspondences is taught varies greatly across programs. There are other correspondences which all programs teach, but with notable variation in the number taught. These include consonant digraphs, vowel effect from letters such as r, l, and w, and consonant-vowel rules (or spelling patterns). One set of correspondences, however--consonant clusters--simply are not taught in some programs. As one summary measure, the number of discrete sounds which were common across programs was about one-fifth of the total number of sounds taught across the four programs.

All programs teach some concomitant skills such as rhyming, syllabication, blending, compound words, and elements of structural analysis as essential parts of their decoding instruction. The overall picture, however, is the same as with sound-symbol correspondence; the number of such skills and the order in which they are presented differ significantly. Thus, although one can identify many discrete skills and subskills, the number which are taught and when they are taught vary widely across the programs.

5. Are the instructional and teaching strategies for teaching skills similar or dissimilar across programs?

In the programs examined there are two main strategies for teaching beginning reading. One is to teach only those words that are formed by the sounds that are taught; the other is to introduce sight words along with some decoding instruction early in the first sememter. Thus, there is no common strategy. Even the two programs which use words formed from previously taught sounds differ in the sheer number of sounds which they believe need to be taught. Thus we did not find clear, consistent, common strategies for teaching these decoding skills

Strategies for teaching comprehension skills were common across programs. All programs used a successive approximation exercise format in which students began with simple exercises. Direct instruction in how to do the exercises seldom occurred. When it did occur, it happened after the exercises were completed and served more of a remedial than a direct instruction end.

6. Are the skills that are labeled and taught in the programs all essential to achieving the behaviors of reading accurately (decoding)and understanding what is being read (comprehension)?

As discussed in the conclusion of the section on skills hierarchies and decoding, we do not know whether all the "essential skills" taught in each program are truly essential. For example, how many of the sound-symbol correspondences which are taught are essential; how many of the decoding rules taught are essential? We recommend further research on this issue.

It is not clear whether all, or even any, of the skill exercises in reading comprehension are essential or necessary. One is not sure that a student who only practiced "finding the main idea" would be deficient on the skill of "determining sequence" even if he never had exercises in that area. Although such studies have been suggested by Davis (1972), no evidence of such studies were found. Indeed, it is possible that students who only read stories and never completed skill exercises might do just as well on comprehension tests as students who completed these exercises. We propose to study this question.

References

Anderson, J., & Bower, G. Human associative memory. New York: John Wiley & Sons, 1973.

Anderson, R. C., & Ortony, A. On putting apples into bottles--A problem of polysemy. Cognitive Psychology, 1975, 7, 176-180

Anderson, R. C., Pichert, J. W., Goetz, E. T., Schallert, D. L., Stevens, K. V., & Trollip, S. R. Instantiation of general terms (Tech. Rep. No. 10). Urbana, Ill.: Center for the Study of Reading, University of Illinois, March 1976.

Aukerman, R. Approaches to beginning reading. New York: John Wiley, 1971.

Baron, J., & Thurston, I. An analysis of the word-superiority effect. Cognitive Psychology, 1973, 4, 207-228.

Berg, P. C. Evaluating reading abilities. In W. H. MacGinitie (Ed.), Assessment problems in readings. Newark, Delaware: International Reading Association, 1973.

Biemiller, A. J. The development of the use of graphic and contextual information as children learn to read. Reading Research Quarterly, 1970, 6, 75-96.

Bleismer, E., & Yarborough, B. A comparison of ten different beginning reading programs in first grade. Phi Delta Kappan, 1965, 46, 500-504.

Bloom, B. Taxonomy of educational objectives, Handbook I: Cognitive domain. New York: David McKay Co., 1956.

Bloom, L. _Language development: Form and function in emerging grammers_. Cambridge, Mass.: M.I.T. Press, 1970.

Bloomfield, L. _Language_. New York: Holt, 1933.

Bloomfield, L. Linguistics and reading. _Elementary English Review_, 1942, _19_, 125-130.

Bohannon, J. Normal and scrambled grammer in discrimination, imitation, and comprehension. _Child Development_, 1976, _47_, 669-681.

Bower, G., Clark, M., Lesgold, A., & Winzenz, D. Hierarchical retrieval schemes in recall of categorized word lists. _Journal of Verbal Learning and Verbal Behavior_, 1969, _8_, 323-343.

Bransford, J., Barclay, J., & Franks, J. Sentence memory: A constructive versus interpretive approach. _Cognitive Psychology_, 1972, _3_, 193-209.

Bransford, J., & Franks, J. The abstraction of linguistic ideas. _Cognitive Psychology_, 1971, _2_, 331-350.

Brown, A. L. The development of memory: Knowing, knowing about knowing, and knowing how to know. In H. W. Reese (Ed.), _Advances in child development and behavior_ (Vol. 10). New York: Academic Press, 1975. Pp. 103-152.

Brown, A. L. Semantic integration in children's reconstruction of narrative sequences. _Cognitive Psychology_, 1976, _8_, 247-262. (b)

Brown, A. L. The construction of temporal succession by preoperational children. In A. D. Pick (Ed.), _Minnesota Symposia on Child Psychology_ (Vol. 10). Minneapolis: University of Minnesota, 1976. (a)

Brown, A. L., & Smiley, S. S. Rating the importance of structural units of prose passages: A problem of metacognitive development. Child Development, 1977, in press.

Brown, R. A first language: The early stages. Cambridge, Mass.: Harvard University Press, 1973.

Bruce, D. Analysis of word sounds by young children. British Journal of Educational Psychology, 1964, 34, 158-169.

Calfee, R., Chapman, R., & Venezky, R. How a child needs to think to learn to read. In L. W. Gregg (Ed.), Cognition in learning and memory. New York: John Wiley, 1972.

Calfee, R., Lindamood, P., & Lindamood, C. Acoustic-phonetic skills and reading--kindergarten through twelfth grade. Journal of Educational Psychology, 1973, 64, 293-298.

Carroll, J. B. Theories of learning and instruction. Chicago: University of Chicago Press, 1964.

Carroll, J. B. Review of Holmes and Singer: Speed and power of reading in high school. Research on the Teaching of English, 1968, 2, 172-184.

Carver, R. P. Reading as reasoning: Implications for measurement. In W. H. MacGinitie (Ed.), Assessment problems in reading. Newark, Delaware: International Reading Association, 1973.

Cattell, J. M. Ueber die Zeit der Erkennung und Benennung von Schriftzeichen, Bildern und Farben. Translated and reprinted in J. Cattell, Man of Science, 1860-1944. Lancaster, PA.: Science Press, 1947.

Chall, J. Learning to read: The great debate. New York: McGraw-Hill, 1967.

Chi, M. Short-term memory limitations in children: Capacity or processing deficits? Memory and Cognition, 1976, 4, 559-572.

Chomsky, C. The acquisition of syntax in children from 5 to 10. Cambridge. Mass.: M.I.T. Press, 1969.

Chomsky, N., & Halle, M. The sound pattern of English. New York: Harper & Row, 1968.

Clark, E. What's in a word? On the child's acquisition of semantics in his first language. In T. Moore (Ed.), Cognitive Development. New York: Academic Press, 1973.

Clymer. T. What is reading?: Some current concepts. In A. M. Robinson (Ed.), Innovation and change in reading instruction. Chicago: University of Chicago Press, 1968.

Clymer, T, et al. Ginn 350 Reading Program: Levels 1-9, Teacher's Editions. Boston, Mass.: Ginn & Company, 1973.

Conrad, R. Speech and reading. In J. Kavanaugh and I. Mattingly (Eds.), Language by ear and by eye. Cambridge, Mass.: M.I.T. Press, 1972.

Craik, F., & Lockhart, R. Levels of processing: A framework for memory research. Journal of Verbal Learning and Verbal Behavior, 1972, 11, 671-684.

Davis, F. B. Research in comprehension in reading. Reading Research Quarterly, 1968, 4, 499-545.

Davis, F. B. Psychometric research on comprehension in reading. *Reading Research Quarterly*, 1972, *7*, 628-678.

Diederich, P. Research 1960-1970 on methods and materials in reading. E.R.I.C, TM Report 22, January 1973.

Dolch, E. W. *Problems in reading*. Champaign, Ill.: Garrard Press, 1948.

Durkin, D. *Teaching them to read (2nd ed)*. Boston, Mass.: Allyn & Bacon, 1974.

Engelmann, S., Bruner, E., & Stearns, S. *Distar reading I, II, and III*. Chicago, Ill.: Science Research Associates, Inc., 1975, 1974, 1972.

Engelmann, S., & Osborn, J. *Distar language I, II, and III*. Chicago, Ill.: Science Research Associates, Inc., 1976, 1973, 1970.

Erwin, S. Changes with age in the verbal determinants of word association. *American Journal of Psychology*, 1961, *74*, 361-372.

Forster, K., & Chambers, S. Lexical access and naming time. *Journal of Verbal Learning and Verbal Behavior*, 1973, *12*, 627-635.

Foshay, A. W., et al. *Educational achievements of thirteen-year olds in twelve countries*. Hamburg, Germany: UNESCO Institute for Education, 1962.

Frederiksen, C. Representing logical and semantic structure of knowledge required from discourse. *Cognitive Psychology*, 1975, *7*, 371-458.

Fries, C. Linguistics and reading. New York: Holt, 1963.

Gagné, R. The conditions of learning. New York: Holt, Rinehart & Winston, 1970.

Gibson, E. J., Shurcliff, A., & Yonas, A. Utilization of spelling patterns by deaf and hearing subjects. In H. Levin and J. P. Williams (Eds.), Basic studies on reading. New York: Basic Books, 1970. Pp. 57-73.

Golinkoff, R. Children's discrimination of English spelling patterns with redundant auditory information. Paper presented at the meeting of the American Educational Research Association, Chicago, Ill., February 1974.

Goodman, K. S. A linguistic study of cues and miscues in reading. Elementary English, 1965, 42, 639-643.

Goodman, K. S. Reading: A psycholinguistic guessing game. Journal of the Reading Specialist, 1967, 6, 126-135.

Hall, W. E., & Robinson, F. P. An analytical approach to the study of reading skills. Journal of Educational Psychology, 1945, 36, 429-442.

Holmes, J. A. Factors underlying major reading disabilities at the college level. Unpublished doctoral dissertation, University of California, Berkeley, 1948.

Hunt, L. C., Jr. Can we measure specific factors associated with reading comprehension? Journal of Educational Research, 1957, 51, 161-171.

Huttenlocher, J. Children's language: Word-phrase relationship. Science, 1964, 143, 264-265.

Hyde, T. S., & Jenkins, J. J. Differential effects of incidental tasks on the organization of recall of lists of highly associated words. Journal of Experimental Psychology, 1969, 82, 472-480.

Jeffrey, W., & Samuels, S. Effect of method of reading training on initial learning and transfer. Journal of Verbal Learning and Verbal Behavior, 1967, 6, 354-358.

Jenkins, J. Remember that old theory of memory? Well, forget it! American Psychologist, 1974, 29, 785-795.

Johnston, C. D., & Jenkins, J. J. Two more incidental tasks that differentially affect associative clustering in recall. Journal of Experimental Psychology, 1971, 89, 92-95.

Joreskog, K. G., & Lawley, D. N. New methods in maximum likelihood factor analysis. British Journal of Mathematical and Statistical Psychology, 1968, 21, 85-96.

Joreskog, K. G., & Van Thillo, M. New rapid algorithms for factor analysis by unweighted least squares, generalized least squares and maximum likelihood (Research Memorandum 71-5). Princeton, N.J.: Educational Testing Service, 1971.

Karlin, R. Teaching elementary reading (2nd ed.). New York: Harcourt, Brace & Jovanovich, 1975.

Kessel, F. The role of syntax in children's comprehension from ages six to twelve. Monographs of the Society for Research in Child Development, 1970, 35, 6.

Kintsch, W. The representation of meaning of memory. Potomac, Maryland: Erlbaum & Associates, 1974.

Klima, E. How alphabets might reflect language. In J. Kavanaugh and I. Mattingly (Eds.), Language by ear and by eye. Cambridge, Mass.: M.I.T. Press, 1972.

Liberman, I. Segmentation of the spoken word and reading acquisition. Paper presented at the Society for Research in Child Development, Philadelphia, March 1973.

Lucas (Mason), J. A stage processing model of reading for elementary school pupils. Unpublished doctoral dissertation, Stanford University, 1973.

Manelis, L., & Yekovich, F. Repetitions of propositional arguments in sentences. Journal of Verbal Learning and Verbal Behavior, 1976, 15, 301-312.

Markman, E. M. Realizing that you don't understand. Child Development, 1977, in press.

Marsh, G., & Sherman, M. Transfer from and components to words and vice versa in beginning reading (SWRC Report TR 23). March, 1970.

Mason, J. The roles of orthographic, phonological and word frequency variables on word-nonword decisions. American Educational Research Journal, 1976, 13.

Mattingly, I. Reading the linguistic process and linguistic awareness. In J. Kavanaugh and I. Mattingly (Eds.), Language by ear and by eye. Cambridge, Mass.: M.I.T. Press, 1972.

McCracken, G., & Wolcutt, C. Basic reading, books A-H, teacher's editions. Philadelphia, Pa.: J. B. Lippincott Company, 1975.

Meyer, D. E., Schvaneveldt, R. W., & Ruddy, M. G. Functions of graphemic and phonemic codes in visual word-recognition. Memory and Cognition, 1974, 2, 309-321.

Moscovitch, M., & Craik, F. Depth of processing, retrieval cues, and uniqueness of encoding as factors in recall. Journal of Verbal Learning and Verbal Behavior, 1976, 15, 447-458.

Murphy, M. D., & Brown, A. L. Incidental learning in preschool children as a function of level of cognitive analysis. Journal of Experimental Child Psychology, 1975, 19, 509-523.

Nelson, K. Structure and strategy in learning to talk. Monograph of the Society for Research in Child Development, 1973, 38, (1-2 Serial No. 149).

Olds, H. An experimental study of syntactical factors influencing children's comprehension of certain complex relationship (Report No. 4). Harvard University, 1968.

Otto, W., McMenemy, R. A., & Smith, R. J. Corrective and remedial teaching (2nd ed.). Boston, Mass.: Houghton Mifflin Co., 1973.

Otto, W., & Askov, E. Rationale and guidelines: The Wisconsin design for reading skill development. Minneapolis, Minn.: National Computer Systems, 1974.

Otto, W., & Askov, E. Teacher's planning guide: Word attack. Minneapolis, Minn.: National Computer Systems, 1974.

Paris, S. G., & Carter, A. Y. Semantic and constructive aspects of sentence memory in children. *Developmental Psychology*, 1973, *9*, 109-113.

Paris, S. G., & Upton, L. Children's memory for inferential relationships in prose. *Child Development*, 1976, *47*, 660-668.

Paris, S. G., Lindauer, B. K., & Cox, G. The development of inferential comprehension. *Child Development*, 1977, in press.

Read, E. Preschool children's knowledge of English Phonology. *Harvard Educational Review*, 1971, *41*, 1-34.

Robinson, H. M. The next decade. In H. M. Robinson (Ed.), *Innovation and change in reading instruction*. Chicago, Ill.: University of Chicago Press, 1968.

Rosinski, R. R., & Wheeler, K. E. Children's use of orthographic structure in word discrimination. *Psychonomic Science*, 1972, *26*, 97-98.

Rozin, P., Poritsky, S., & Sotsky, R. American children with reading problems can easily learn to read English represented by Chinese characters. *Science*, 1971, *171*, 1264-1267.

Rubenstein, H., Lewis, S. S., & Rubenstein, M. A. Evidence for phonemic recoding in visual word recognition. *Journal of Verbal Learning and Verbal Behavior*, 1971, *10*, 645-657.

Schreiner, R. L., Hieronymus, A. N., & Forsyth, R. Differential measurement of reading abilities at the elementary school level. *Reading Research Quarterly*, 1969, *5*, 84-99.

Shank, R. Conceptual dependency: A theory of natural language understanding. Cognitive Psychology, 1972, 3, 552-631.

Shankweiler, D., & Liberman, I. Misreading: A search for causes. In J. Kavanaugh and I. Mattingly (Eds.), Language by ear and by eye. Cambridge, Mass.: M.I.T. Press, 1972.

Silberman, H. Experimental analysis of a beginning reading skill. Programmed Instruction, 1964, 3, 4-8.

Singer, H. A developmental model of speed of reading in grades 3 through 6. Reading Research Quarterly, 1965, 1, 29-49.

Singer, H. Reply to John Carroll's comments on the Holmes-Singer monograph and on the substrata-factor theory of reading. Research in the Teaching of English, 1969, 3, 87-102.

Slobin, D. Grammatical transformations and sentence comprehension in childhood and adulthood. Journal of Verbal Learning and Verbal Behavior, 1966, 5, 219-227.

Spache, G. D. Toward better reading. Champaign, Ill.: Garrard, 1963.

Spearritt, D. Identification of subskills of reading comprehension by maximum likelihood factor analysis. Reading Research Quarterly, 1972, 8, 92-111.

Stein, N. L., & Glenn, C. G. The developmental study of children's recall of story material. Paper presented at the Society for Research in Child Development meeting, Denver, 1975.

Stoltz, W., & Tiffany, J. Production of "child-like" word associations by adults to unfamiliar adjectives. Journal of Verbal Learning and Verbal Behavior, 1971, 11, 38-45.

Stolurow, L. M., & Newman, R. S. A factorial analysis of objective features of printed language presumably related to reading difficulty. Journal of Educational Research, 1959, 52, 243-251.

Surber, J., & Mason, J. Teaching preschool children decoding skills for reading: Rule learning and transfer. Journal of Reading Behavior, in press.

Thorndike, E. Reading as reasoning: A study of mistakes in paragraph reading. Journal of Educational Psychology, 1917. 8, 323-332.

Thorndike, R. L. Reading comprehension education in fifteen countries: International Studies in Evaluation III. New York: Halsted Press, 1973.

Thorndyke, P. Cognitive structures in human story comprehension and memory. Unpublished doctoral dissertation, Stanford University; Technical Report, p.5513, Rand Corporation, Santa Monica, CA, 1975.

Thorndyke, P. The role of inferences in discourse comprehension. Journal of Verbal Learning and Verbal Behavior, 1976, 15, 437-446.

Thurstone, L. L. Note on a reanalysis of Davis' reading tests. Psychometrika, September 1946, 11, 185-188.

Tinker, M. A. & McCullough, C. M. Teaching elementary reading (4th ed.). Englewood Cliffs, N.J.: Prentice-Hall, 1975.

Turner, E. A., & Rommetveit, R. The acquisition of sentence voice and reversibility, Child Development, 1967, 38, 649-660.

Venezky, R. The structure of English orthography. The Hague: Mouton, 1970.

Venezky, R., & Johnson, D. The development of two letter-sound patterns in grades 1-3. Journal of Educational Psychology, 1973, 64, 109-115.

Vernon, M. The experimental study of reading. Cambridge, Mass.: Cambridge University Press, 1931.

Wardhaugh, R. Theories of language acquisition in relation to beginning reading instruction. In H. Singer and R. Ruddell (Eds.), Theoretical models and processes of reading. Newark: International Reading Association, 1976.

Weber, R. M. The study of oral reading errors: A survey of the literature. Reading Research Quarterly, 1968, 4, 96-119.

Wittick, M. L. Innovations in reading instruction: For beginners. In H. M. Robinson (Ed.), Innovation and change in reading instruction. Chicago, Ill.: University of Chicago Press, 1968.

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